Comprehensive Nutrient Management Plan (CNMP)
(Version 3, 8/17/2016 Format)

The Comprehensive Nutrient Management Plan (CNMP) is an important part of the conservation management system (CMS) for your Animal Feeding Operation (AFO). This CNMP documents the planning decisions and operation and maintenance information for the AFO.

Farm/Facility: Crutchfield
Highway 140 North
McKenzie, Tn 38201
36.202494, -88.513179
Mailing Address 1586 Atlantic Avenue, Henry Tn 38231

Owner/Operator: Jimmy Tosh

Plan Period: Oct 2016 - Sep 2021

Certified Comprehensive Nutrient Management Plan (CNMP) Planner

As a Certified Comprehensive Nutrient Management Plan (CNMP) Planner, I certify that I have reviewed the *Comprehensive Nutrient Management Plan* and that the elements of the document are technically compatible, reasonable and can be implemented.

Signature: ______________________________ Date: ______________
Name: J.T. Workman IV
Title: Workman Consulting TSP Certification Credentials:TSP 10-6884

Conservation District (Optional)

As a Conservation District employee, I have reviewed the *Comprehensive Nutrient Management Plan* and concur that the plan meets the District's conservation goals.

Signature: ______________________________ Date: ______________
Name:
Title:

Owner/Operator

As the owner/operator of this CNMP, I, as the decision maker, have been involved in the planning process and agree that the items/practices listed in each element of the CNMP are needed. I understand that I am responsible for keeping all necessary records associated with implementation of this CNMP. It is my intention to implement/accomplish this CNMP in a timely manner as described in the plan.

Signature: ______________________________ Date: ______________
Name:

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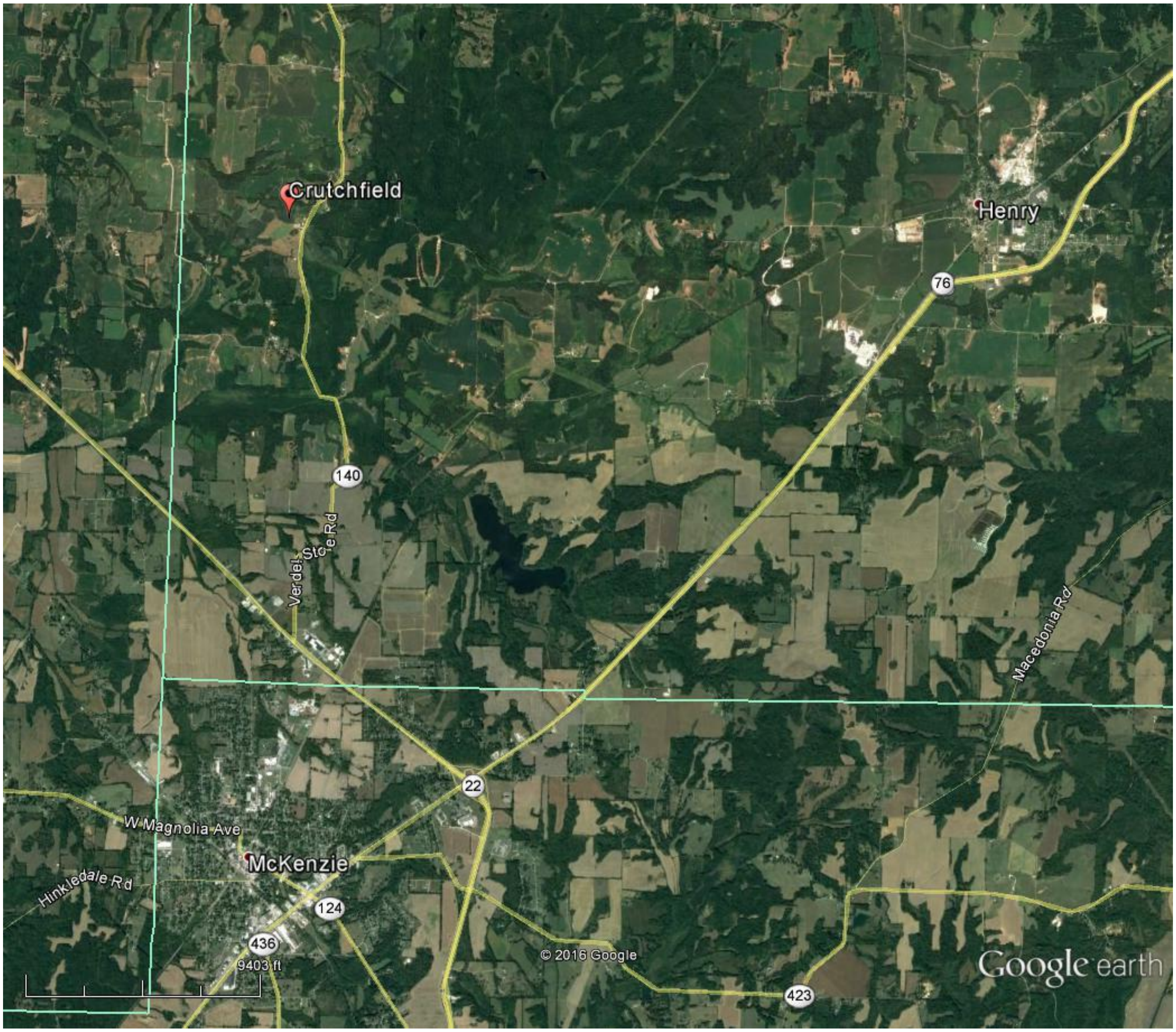
Section 1. Farmstead (Production Area)

1.1. Maps of Existing and Planned Farmstead Conservation Practices


Crutchfield
Henry
76
140
Verdel Store Rd
Macedonia Rd
22
W Magnolia Ave
McKenzie
Hinkledale Rd
124
436
9403 ft
© 2016 Google
Google earth
423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Full Engineering specs for dirt work and building placement will be in separate document.

1.2. Farmstead Conservation Practices -- Record of Decisions

Waste Storage Facility (313)

Facility(s)	Planned amount (No.)	Month	Year	Amount Applied	Date
6	6	3	2017		
Total	6				

A waste impoundment structure has been constructed, according to NRCS specifications to temporarily store waste such as manure, wastewater, and contaminated runoff as a function of an agricultural waste management system which will protect the environment and public health and safety. Practice lifespan is 15 years. Refer to design drawings and practice standard 313 for additional information.

Composting Facility (317)

Create composting facility to properly dispose of dead hogs. Compost will need to be tested for nutrient levels. See Practice Standard 317.

Field(s)	Planned amount (No.)	Month	Year	Amount Applied	Date
1	1.0	3	2017		
Total	1.0				

All dead pigs must be immediately put in the compost facility and covered with a carbon matter. Suggested carbon matter is sawdust.

All NRCS conservation practices shall be installed, operated and maintained according to NRCS conservation practice standards and associated technical specifications.

1.3. Farmstead Conservation Practices – Implementation Requirements

UT Extension
W255

Disposing of Large Animal Mortalities in Tennessee

Forbes Walker, Associate Professor, and Shawn Hawkins, Assistant Professor
Biosystems Engineering and Soil Science

Animal deaths are a regrettable but sometimes unavoidable part of livestock production. Once an animal dies, it is important to handle and dispose of the carcass in a way that reduces the potential for impacting the health of humans and other livestock and minimizes the impact to the environment, such as pollution of groundwater or surface water. It is recommended that dead animals be disposed of within 48 hours of discovery in a way that follows state guidelines.

In May 2009, the Tennessee Department of Agriculture released its guidelines on handling mortalities in a short policy document entitled "Policy Concerning the Disposal of Dead Farm Animals and The Disposal Offal from Custom Slaughter Facilities." This document can be viewed at the Tennessee Department of Agriculture's website at: http://tn.gov/agriculture/publications/regulatory/animaldisposal.pdf

In Tennessee, dead animal carcasses are defined as a "solid waste," so are regulated by the Tennessee Department of the Environment and Conservation (TDEC), Division of Solid Waste. The disposal of dead animals falls under the solid waste regulations outlined by TDEC at its website: http://www.tennessee.gov/sos/rules/1200/1200-01/1200-01-07.20081126.pdf

The methods that livestock producers in Tennessee can choose to dispose of their dead animals include:

- On-farm burial
- Composting
- Landfilling
- Burning
- Incineration
- Rendering

the center of this base material with the extremities at least 2 feet away from the edge of the base material. Finally, the carcass should be covered with 2 feet of amendment that is mounded to divert rather than capture rainfall. The process will be complete in 3-9 months (only bones are left) and the material can then be land-applied.

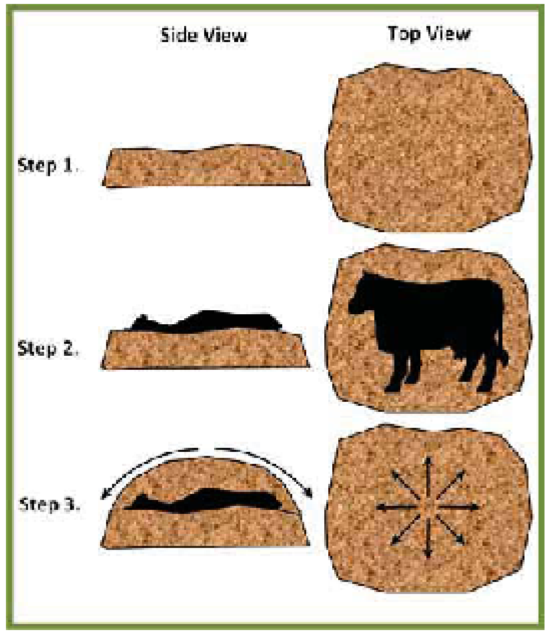

Figure 1. Top and side view schematics illustrating static pile composting of a large animal mortality. Rainfall drainage is illustrated in Step 3.

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University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating.
UT Extension provides equal opportunities in programs and employment.

1.4. Animal Inventory

Animal Group	Type or Production Phase	Number of Animals[a]	Average Weight (lbs)	Confinement Period	Manure Collected (%)[b]	Manure Storage
G1	Gestating sow	1,500	400	Jan Early - Dec Late	100	G1
G2	Gestating sow	1,500	400	Jan Early - Dec Late	100	G2
G3	Gestating sow	1,500	400	Jan Early - Dec Late	100	G3
G4	Gestating sow	1,500	400	Jan Early - Dec Late	100	G4
F1	Sow & litter	720	400	Jan Early - Dec Late	100	F1
F1 Piglets	Nursery pig	6,100	8	Jan Early - Dec Late	100	F1
F2	Sow & litter	840	400	Jan Early - Dec Late	100	F2
F2 Piglets	Nursery pig	7,140	8	Jan Early - Dec Late	100	F2

a. The average number of animals present in the production facility at any one time.
b. If manure collected is less than 100%, this indicates that the animals spend a portion of the day outside of the production facility or the production facility is unoccupied one or more times during the confinement period.

1.5. Manure Storage Information

Storage ID	Type of Storage	Pumpable or Spreadable Capacity	Annual Manure Collected	Maximum Days of Storage
G1	In-house storage pit	2,365,989 gal	642,857 gal	1,343
G2	In-house storage pit	2,365,989 gal	642,857 gal	1,343
G3	In-house storage pit	2,581,110 gal	642,857 gal	1,465
G4	In-house storage pit	2,581,110 gal	642,857 gal	1,465
F1	In-house storage pit	3,053,747 gal	308,520 gal	3,613
F2	In-house storage pit	3,053,747 gal	308,520 gal	3,613

Farrowing Barns are 196 by 277 by 8 Feet deep pit

2 Gestation Barns are 127 by 331 by 8 Feet deep pit

2 Gestation Barns are 121 by 379 by 8 feet deep pit

Engineering Drawings will be placed at end of document. Buildings would be setup same as drawing just will be expanded or smaller than those plans.

Manure production comes from Herrondale site and increased by percentage as this site is larger. Pigs will be same size using same feeders with same integrator for feed. Manure results were also used just as a reference until this site is built with actual numbers to use.

1.6. Planned Manure Exports

Month-Year	Manure Source	Amount	Receiving Operation	Location

(None)

1.7. Planned Manure Imports

Month-Year	Manure's Animal Type	Amount	Originating Operation	Location

(None)

1.8. Planned Internal Transfers of Manure

Month-Year	Manure Source	Amount	Manure Destination

(None)

1.9. Brief Description of or Additional Information about Animal Feeding Operation (Optional)

Crutchfield is a sow unit that will house 7,560 sows and a 13,240 piglets in a nursery for Tosh Pork LLC. The facility will have 4 buildings that house gestating sows and 2 buildings that house sows and their litter. The manure is confined in pit storage and will be spread on surrounding fields with a dragline system. The crop rotation is corn, beans and wheat. The closest stream is 2300 feet away and it eventually flows into Spring creek, which is not impaired.

1.2. Sampling, Calibration and Other Statements

- Manure sampling frequency
  Manure test will be taken annually.

- Soil testing frequency
  No soil testing is required

- Equipment calibration method and frequency
  No calibration required manure is sold.

- Clean water diversion
  No clean water will enter pit. It is sealed off from outside water.

- Measures to prevent direct contact of animals with water
  All animals will remain inside above the under floor pit.

1.3. Natural Resource Concerns

If checked, the indicated resource concerns have been identified and have been addressed in this plan.

Soil Quality Concerns

	Soil Quality Concern	*Activities to Address Concern*
	Ephemeral Gully Erosion	

	Soil Quality Concern	*Activities to Address Concern*
	Gully Erosion	
	Sheet and Rill Erosion	
	Stream/Ditchbank Erosion	
	Wind Erosion	

Water Quality Concerns

	Water Quality Concern	*Activities to Address Concern*
X	Facility Wastewater Runoff	Manure Stored in an underfloor pit covered by a roof
X	Manure Runoff (Field Application)	Manure applied on P Basis
	Manure Runoff (From Facilities)	
	Nutrients in Groundwater	
	Nutrients in Surface Water	
	Silage Leachate	
X	Excessive Soil Test Phosphorus	All Low to Medium
	Tile-Drained Fields	

Other Concerns Addressed

	Other Concern	*Activities to Address Concern*
X	Acres Available for Manure Application	All acres in plan
	Aesthetics	
	Maximize Nutrient Utilization	
	Minimize Nutrient Costs	

	Other Concern	*Activities to Address Concern*
X	Neighbor Relations	Closest Neighbor 1,100 feet away.
	Profitability	
	Regulations	
	Soil Compaction	
X	Time Available for Manure Application	Manure can be applied Spring or Fall
	Odors	
X	Air Quality	This facility shouldn’t affect air quality
X	Biosecurity	Plan in place.

In Case of an Emergency Storage Facility Spill, Leak or Failure

Implement the following first containment steps:

a. Stop all other activities to address the spill.
b. Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
c. Call for help and excavator if needed.
d. Complete the clean-up and repair the necessary components.
e. Assess the extent of the emergency and request additional help if needed.

In Case of an Emergency Spill, Leak or Failure during Transport or Land Application

Implement the following first containment steps:

a. Stop all other activities to address the spill and stop the flow.
b. Call for help if needed.
c. If the spill posed a hazard to local traffic, call for local traffic control assistance and clear the road and roadside of spilled material.
d. Contain the spill or runoff from entering surface waters using straw bales, saw dust, soil or other appropriate materials.
e. If flow is coming from a tile, plug the tile with a tile plug immediately.
f. Assess the extent of the emergency and request additional help if needed.

Emergency Contacts

Department / Agency	Phone Number
Fire	731-243-4091
Rescue services	731-642-5581
State veterinarian	615-837-5183
Sheriff or local police	731-642-1672

Nearest available excavation equipment/supplies for responding to emergency

Equipment Type	Contact Person	Phone Number
Trackhoe	Jamie Tosh	731-694-8792

Contacts to be made by the owner or operator within 24 hours

Organization	Phone Number
EPA Emergency Spill Hotline	1-800-424-8802
County Health Department	731-642-4025
Other State Emergency Agency	1-888-891-8332 TDEC's Water Pollution Control

Be prepared to provide the following information:

a. Your name and contact information.
b. Farm location (driving directions) and other pertinent information.
c. Description of emergency.
d. Estimate of the amounts, area covered, and distance traveled.
e. Whether manure has reached surface waters or major field drains.
f. Whether there is any obvious damage: employee injury, fish kill, or property damage.
g. Current status of containment efforts.

Biosecurity Measures

Biosecurity is critical to protecting livestock and poultry operations. Visitors must contact and check in with the producer before visiting the operation or entering any production or storage facility.

The following narrative describes how animal veterinary wastes (including medical equipment, empty containers, sharps and expired medications) will be managed at the operation.

Medicine will be disposed to as directed on label. Needles and other sharps will be put in to a sharps container. If any medicine is left it shall remain in the control rooms or in a building that is protected from outside environment and stored according to label.

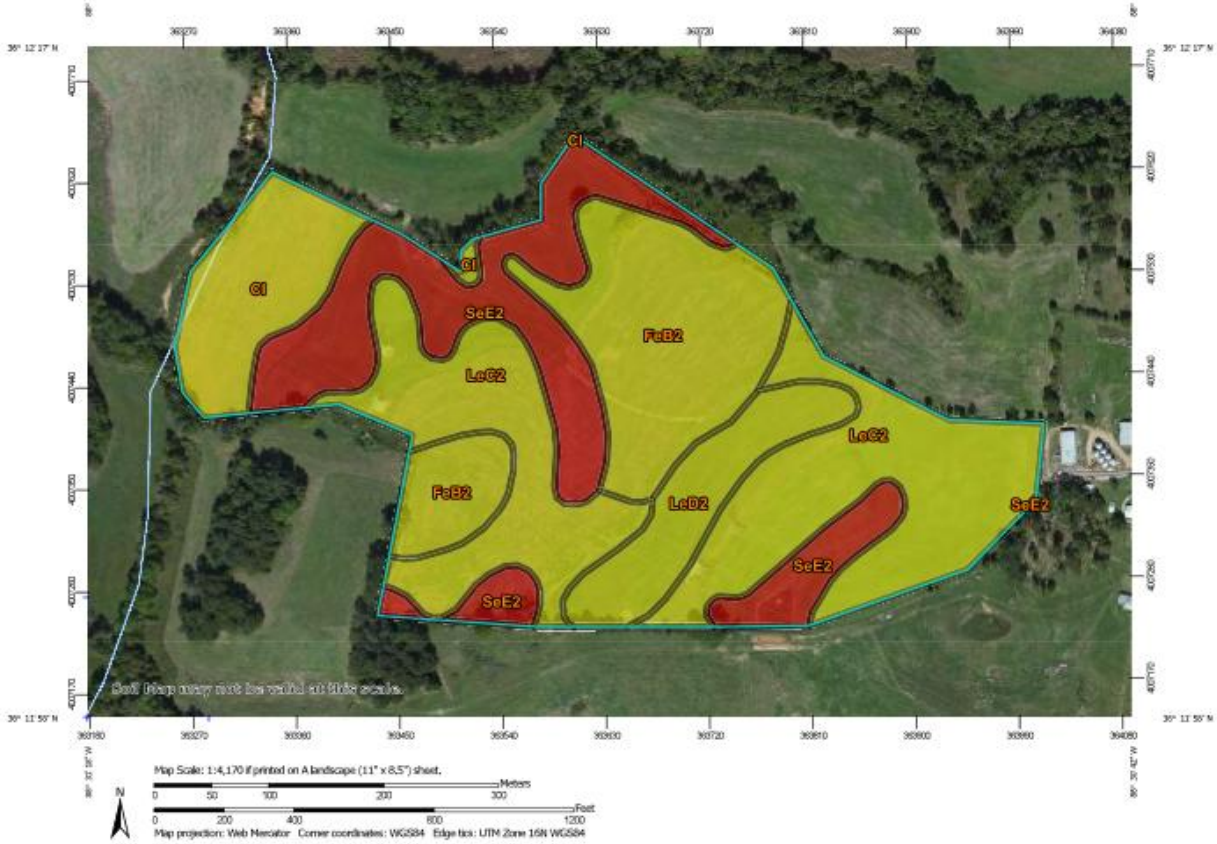
Catastrophic Animal Mortality Management

Refer to NRCS standards, or state guidance, regarding appropriate catastrophic animal mortality handling methods.

Plan for Catastrophic Animal Mortality Management

The following narrative describes how catastrophic animal mortality will be managed in a manner that protects surface and ground water quality. All national, state and local laws, regulations and guidelines that protect soil, water, air, plants, animals and human health must be followed.

Catastrophic Mortality, Large Animal Disposal, Pit—Henry County, Tennessee



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

4/15/2017
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Tables — Catastrophic Mortality, Large Animal Disposal, Pit — Summary By Map Unit

mmary by Map Unit — Henry County, Tennessee (TN079)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
Cl	Cascilla silt loam, 0 to 3 percent slopes, rarely flooded	Somewhat limited	Cascilla (95%)	Flooding (0.40)	4.9	10.2%
				Dusty (0.05)		
				Unstable excavation walls (0.01)		
FeB2	Feliciana silt loam, 2 to 5 percent slopes, eroded	Somewhat limited	Feliciana (92%)	Dusty (0.05)	10.6	22.2%
				Unstable excavation walls (0.01)		
LeC2	Lexington silt loam, 5 to 8 percent slopes, eroded	Somewhat limited	Lexington (95%)	Seepage (0.52)	17.2	35.9%
				Dusty (0.05)		
				Slope (0.04)		
				Unstable excavation walls (0.01)		
LeD2	Lexington silt loam, 8 to 12 percent slopes, eroded	Somewhat limited	Lexington (97%)	Slope (0.84)	4.1	8.5%
				Seepage (0.52)		
				Dusty (0.05)		
				Unstable excavation walls (0.01)		
SeE2	Smithdale loam, 12 to 25 percent slopes, eroded	Very limited	Smithdale (100%)	Slope (1.00)	11.1	23.1%
				Seepage (0.52)		
				Adsorption (0.08)		
				Dusty (0.03)		
				Unstable excavation walls (0.01)		
Totals for Area of Interest					**47.9**	**100.0%**

Table — Catastrophic Mortality, Large Animal Disposal, Pit — Summary by Rating Value

mmary by Rating Value

Rating	Acres in AOI	Percent of AOI
Somewhat limited	36.8	76.9%
Very limited	11.1	23.1%
Totals for Area of Interest	**47.9**	**100.0%**

Description — Catastrophic Mortality, Large Animal Disposal, Pit

"Catastrophic mortality, large animal disposal, pit," is a method of disposing of dead animals by placing the carcasses in successive layers in an excavated pit. The carcasses are spread, compacted, and covered daily with a thin layer of soil that is excavated from the pit. When the pit is full, a final cover of soil material at least 2 feet thick is placed over the burial pit.

The interpretation is applicable to both heavily populated and sparsely populated areas. While some general observations may be made, onsite evaluation is required before the final site is selected. Improper site selection, design, or installation may cause contamination of ground water, seepage, and contamination of stream systems from surface drainage or floodwater. The risk of contamination can be reduced or eliminated by installing systems designed to eliminate or reduce the adverse effects of limiting soil properties. Ratings are for soils in their present condition. The present land use is not considered in the ratings.

Ratings are based on properties and qualities to the depth normally observed during soil mapping (approximately 6 or 7 feet). However, because pits may be as deep as 15 feet or more, geologic investigations are needed to determine the potential for pollution of ground water and to determine the design needed. These investigations, which are generally arranged by the pit developer, include examination of stratification, rock formations, and geologic conditions that might lead to the conducting of leachates to aquifers, wells, watercourses, and other water sources. The presence of hard, nonrippable bedrock, bedrock crevices, or highly permeable strata at or directly below the proposed pit bottom is undesirable because of the difficulty in excavation and the potential pollution of underground water.

Properties that influence the risk of pollution, ease of excavation, trafficability, and revegetation are major considerations. Soils that are flooded or have a water table within the depth of excavation present a potential pollution hazard and are difficult to excavate. Slope is an important consideration because it affects the work involved in road construction, the performance of the roads, and the control of surface water around the pit. It may also cause difficulty in constructing pits in which the pit bottom must be kept level and oriented to follow the contour of the land.

The ease with which the pit is dug and with which a soil can be used as daily and final cover is based largely on soil texture and consistence, which determine workability when the soil is dry and when it is wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and difficult to place as a uniformly thick cover over a layer of carcasses. The uppermost part of the final cover should be soil material that favors the growth of plants. It should not contain excess sodium or salts and should not be too acid. In comparison with other horizons, the surface layer in most soils has the best workability and the highest content of organic matter. Thus, it may be desirable to stockpile the surface layer for use in the final blanketing of the filled pit area.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected of a properly designed and installed system. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of the individual limitations. The ratings are shown in decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

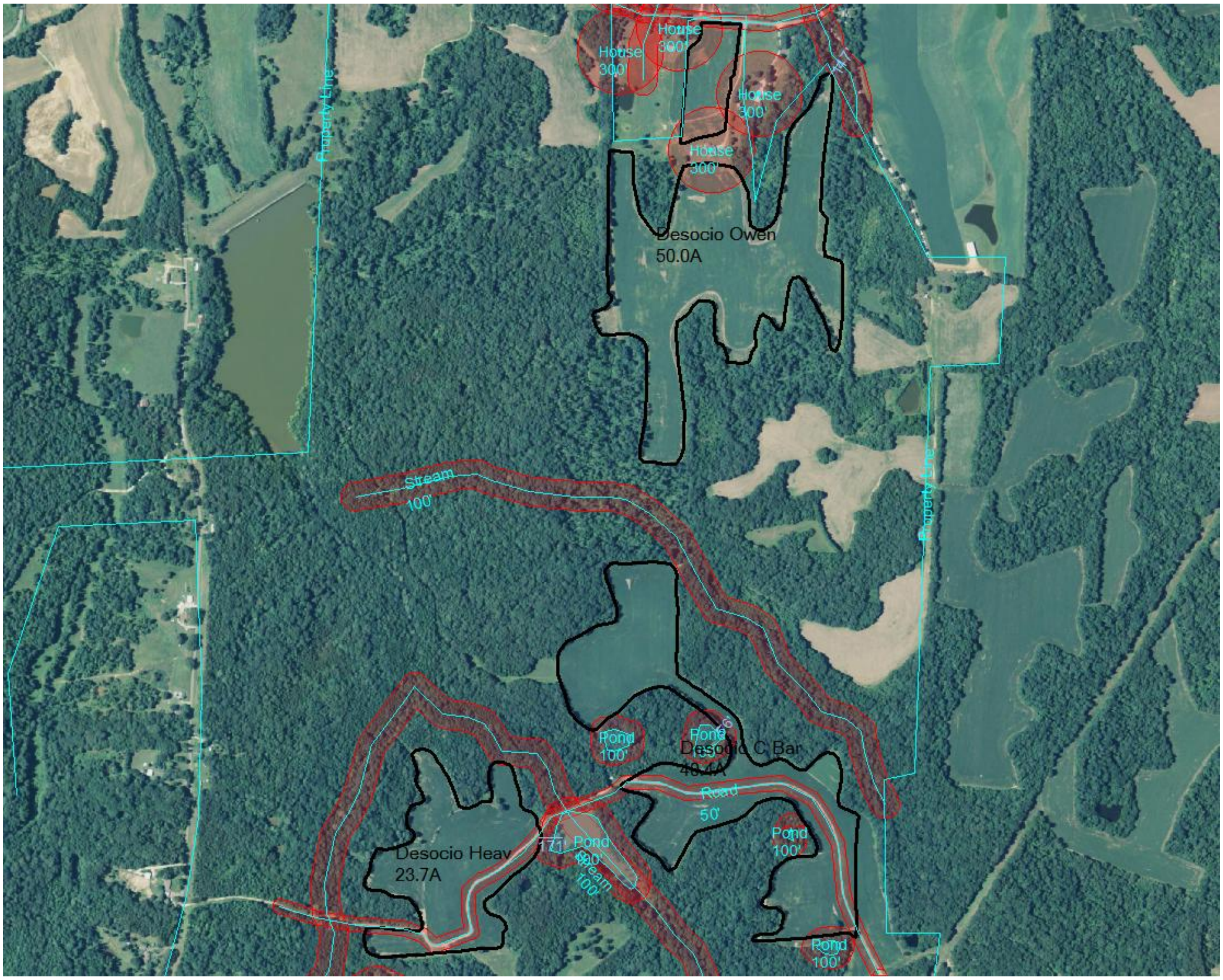
The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

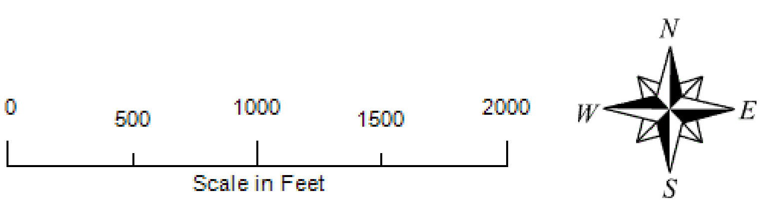
Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Section 2. Crop and Pasture (Land Treatment)

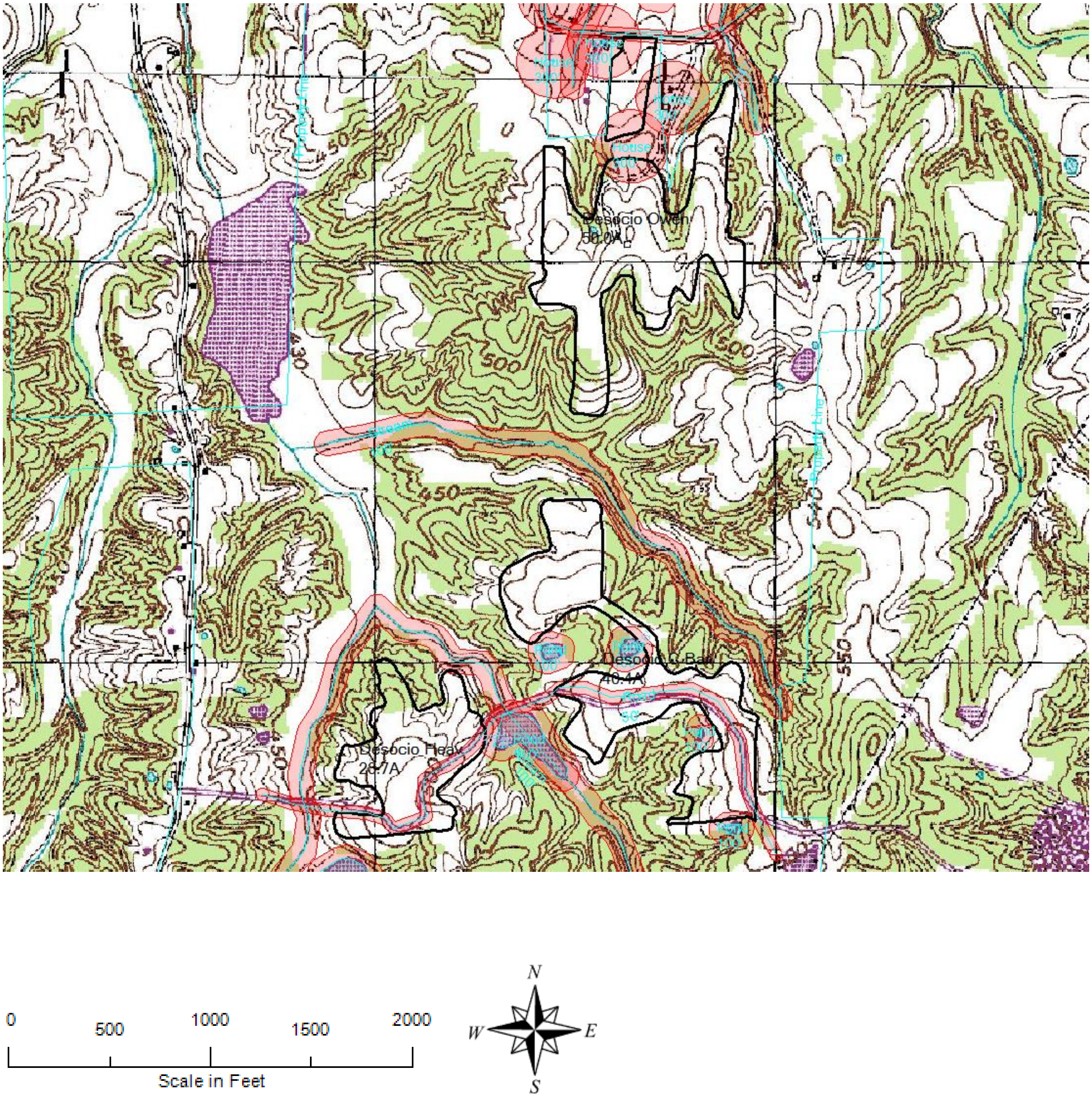
2.1. Maps of Fields, Soils, Application Setbacks, Existing and Planned Crop and Pasture Conservation Practices

Fields with Setbacks





Topo Map


Desocio Owen
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Desocio K-Barn
40.4A
Desocio Heav
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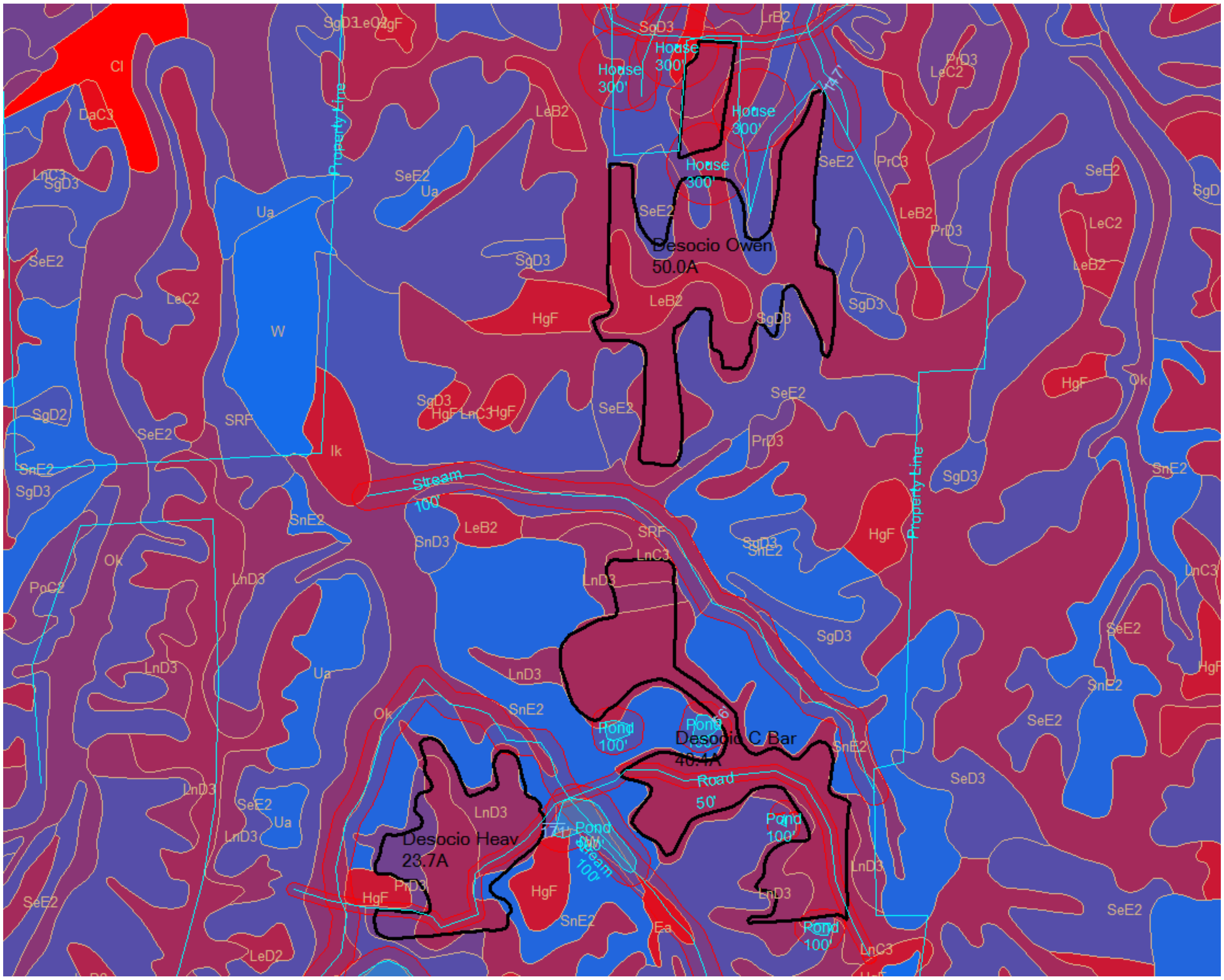
Soil Map


Desocio Owen
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Desocio C Bar
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Desocio Heav
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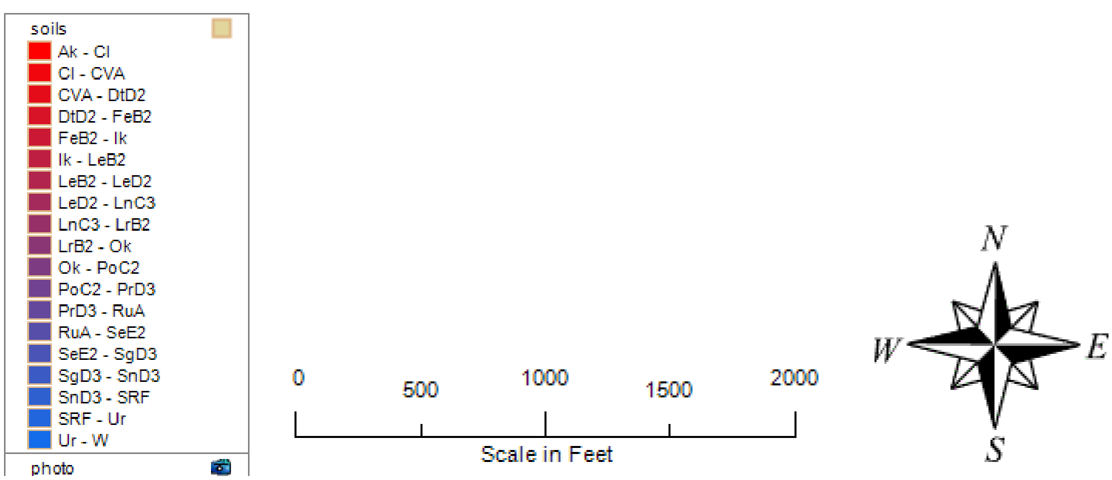
Property Line
Stream
100'
House
300'
Pond
100'
Road
50'
Cl
DaC3
W
Ua
SRF
Ik
HgF
LeB2
SeE2
SgD3
SnE2
LnD3
LnC3
PrD3
Ok
PoC2
LeC2
SgD2
SeD3
LeD2
Ea


soils
Ak - Cl
Cl - CVA
CVA - DtD2
DtD2 - FeB2
FeB2 - Ik
Ik - LeB2
LeB2 - LeD2
LeD2 - LnC3
LnC3 - LrB2
LrB2 - Ok
Ok - PoC2
PoC2 - PrD3
PrD3 - RuA
RuA - SeE2
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SgD3 - SnD3
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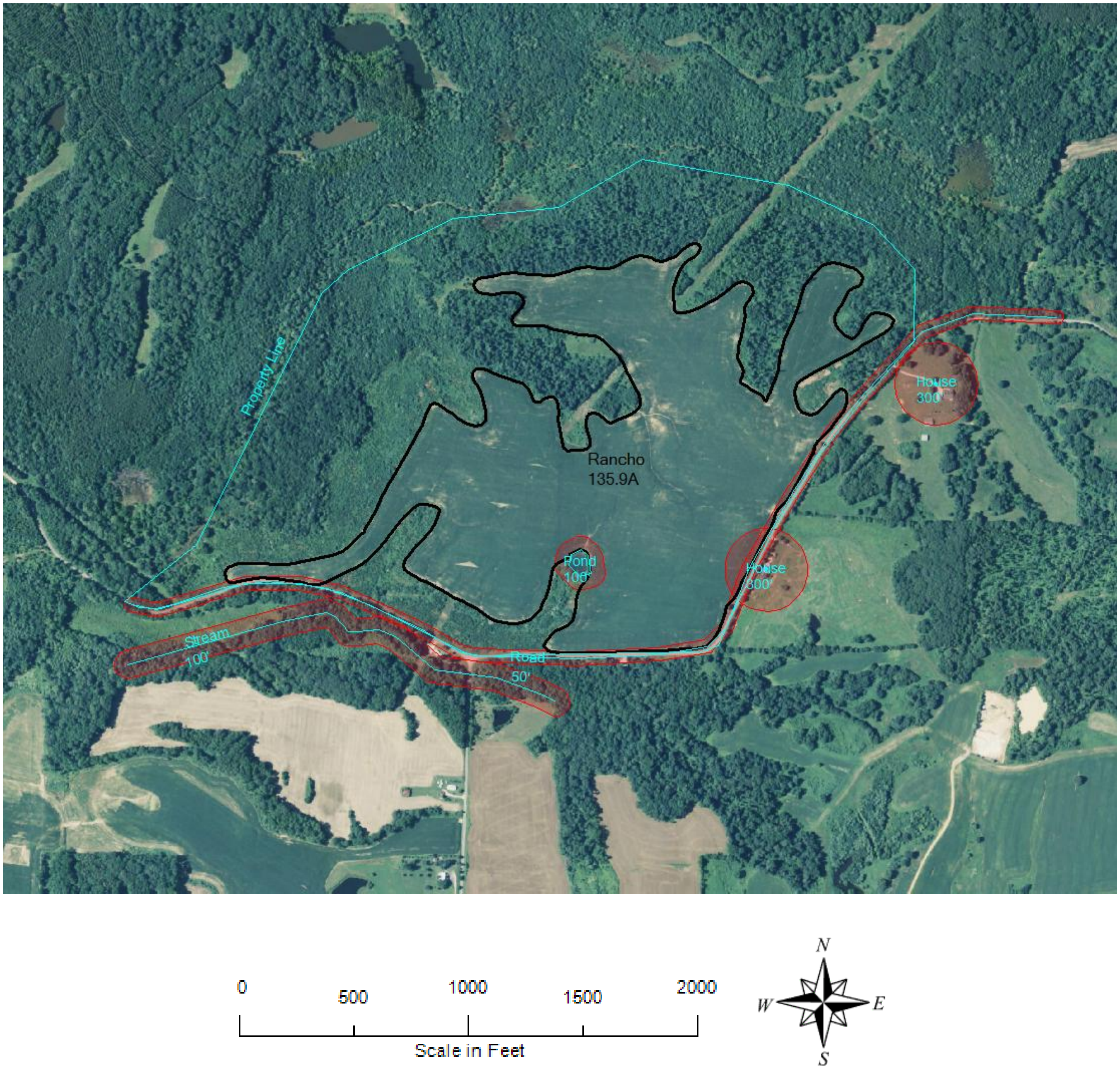
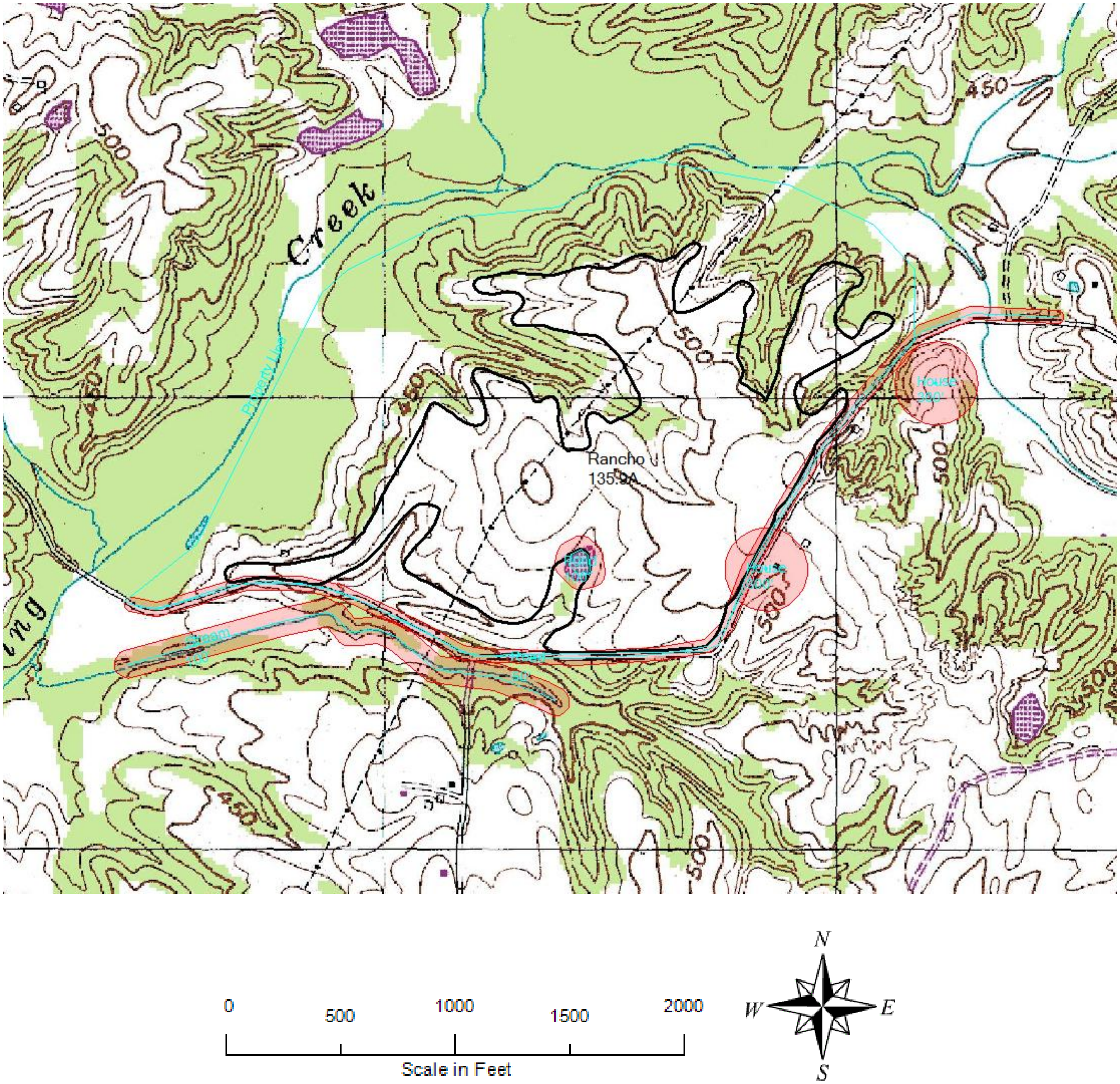
Field with Setbacks



Topo Map


Creek
Rancho
135.9A
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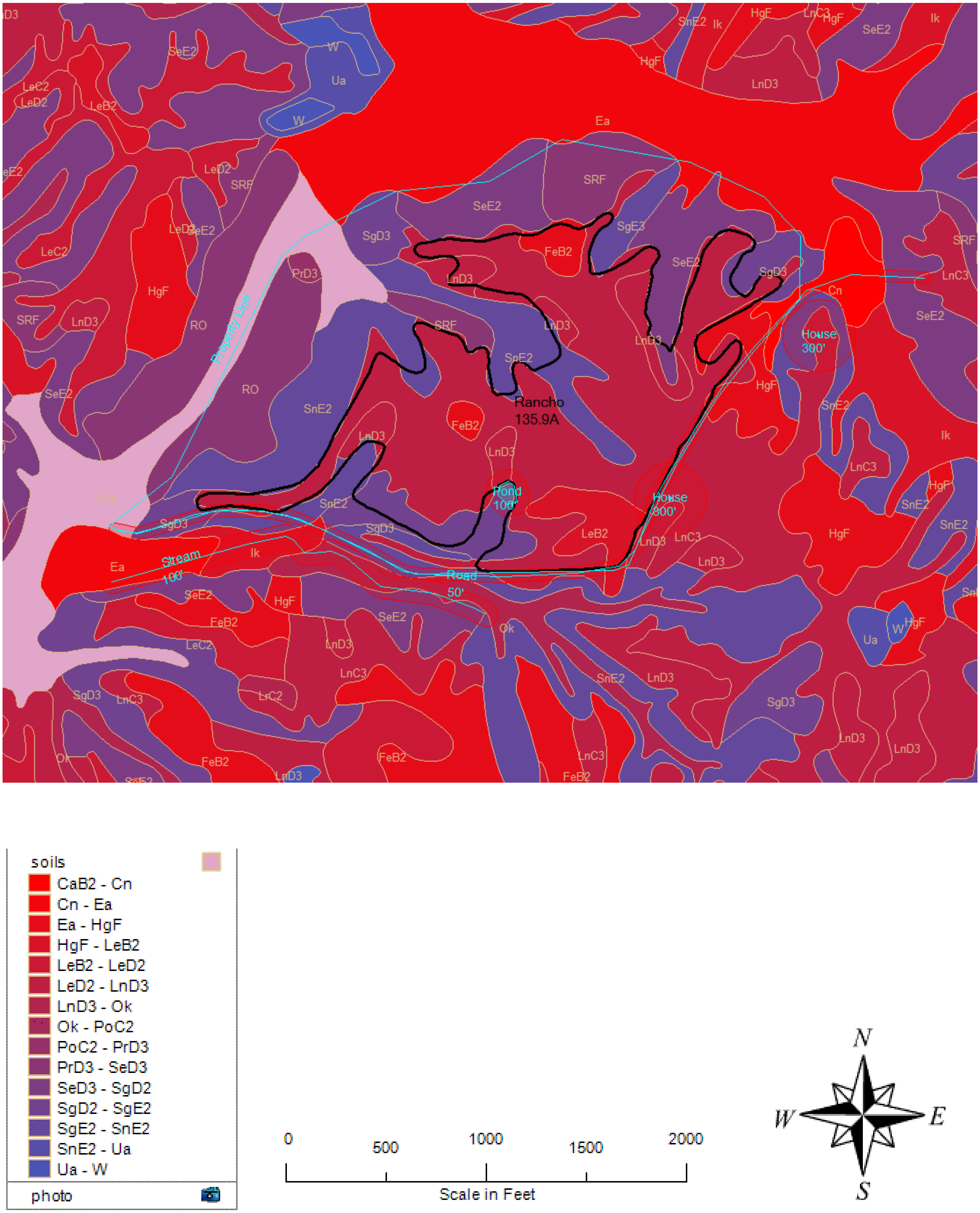
Soil Map



Rancho
135.9A
Property Line
Stream
100'
Road
50'
Pond
100'
House
300'
House
300'
SeE2
SgD3
SnE2
FeB2
LnD3
SRF
Ea
HgF
RO
LeB2
LnC3
Ik
Ok
Ua
W
Cn
soils
CaB2 - Cn
Cn - Ea
Ea - HgF
HgF - LeB2
LeB2 - LeD2
LeD2 - LnD3
LnD3 - Ok
Ok - PoC2
PoC2 - PrD3
PrD3 - SeD3
SeD3 - SgD2
SgD2 - SgE2
SgE2 - SnE2
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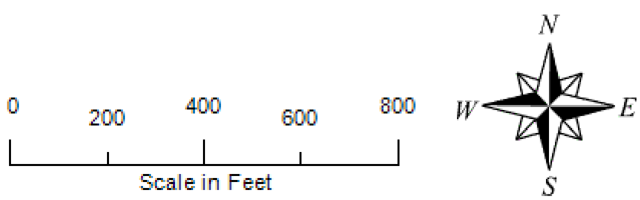
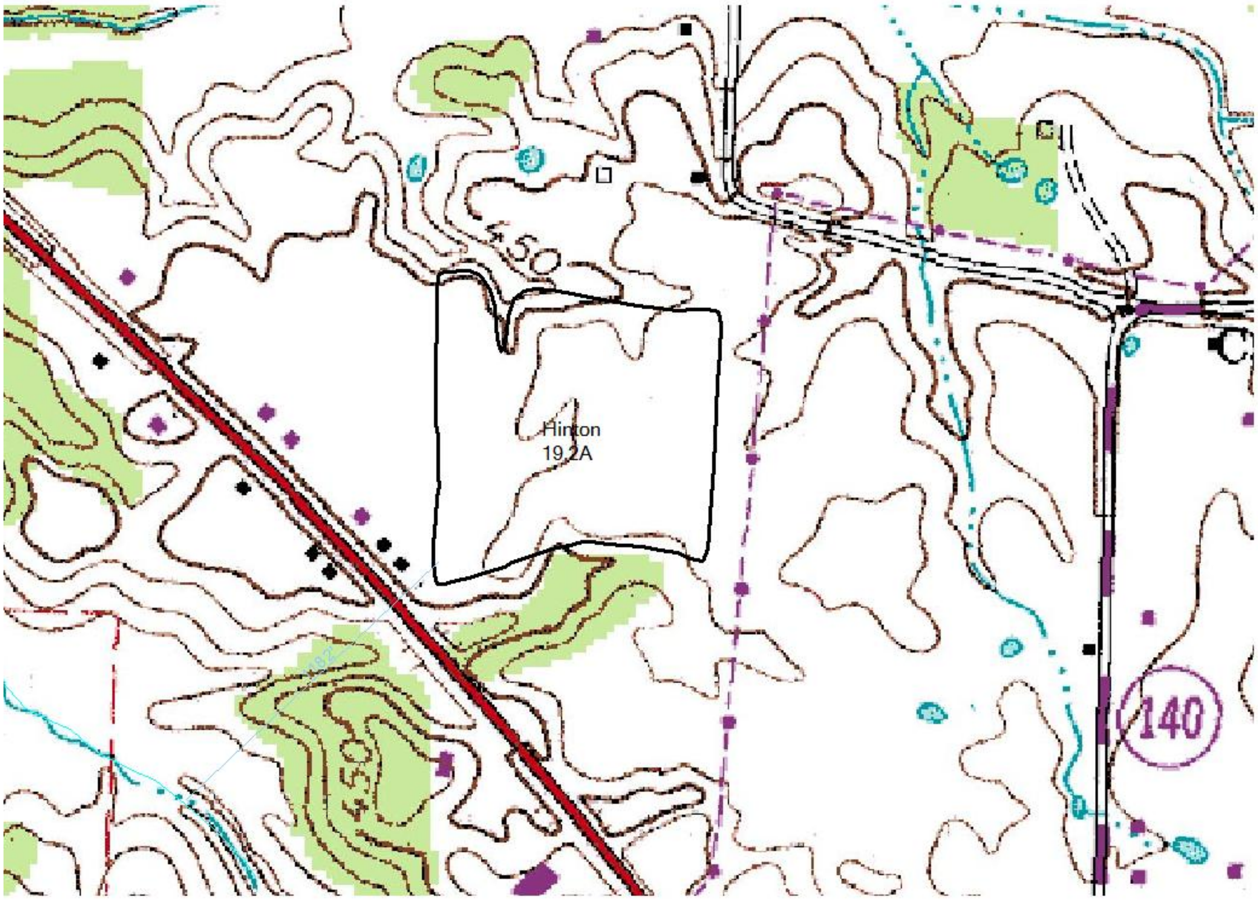
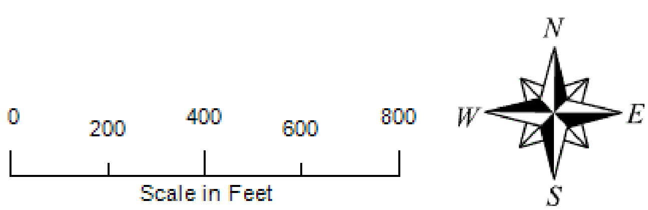
Map with Setbacks

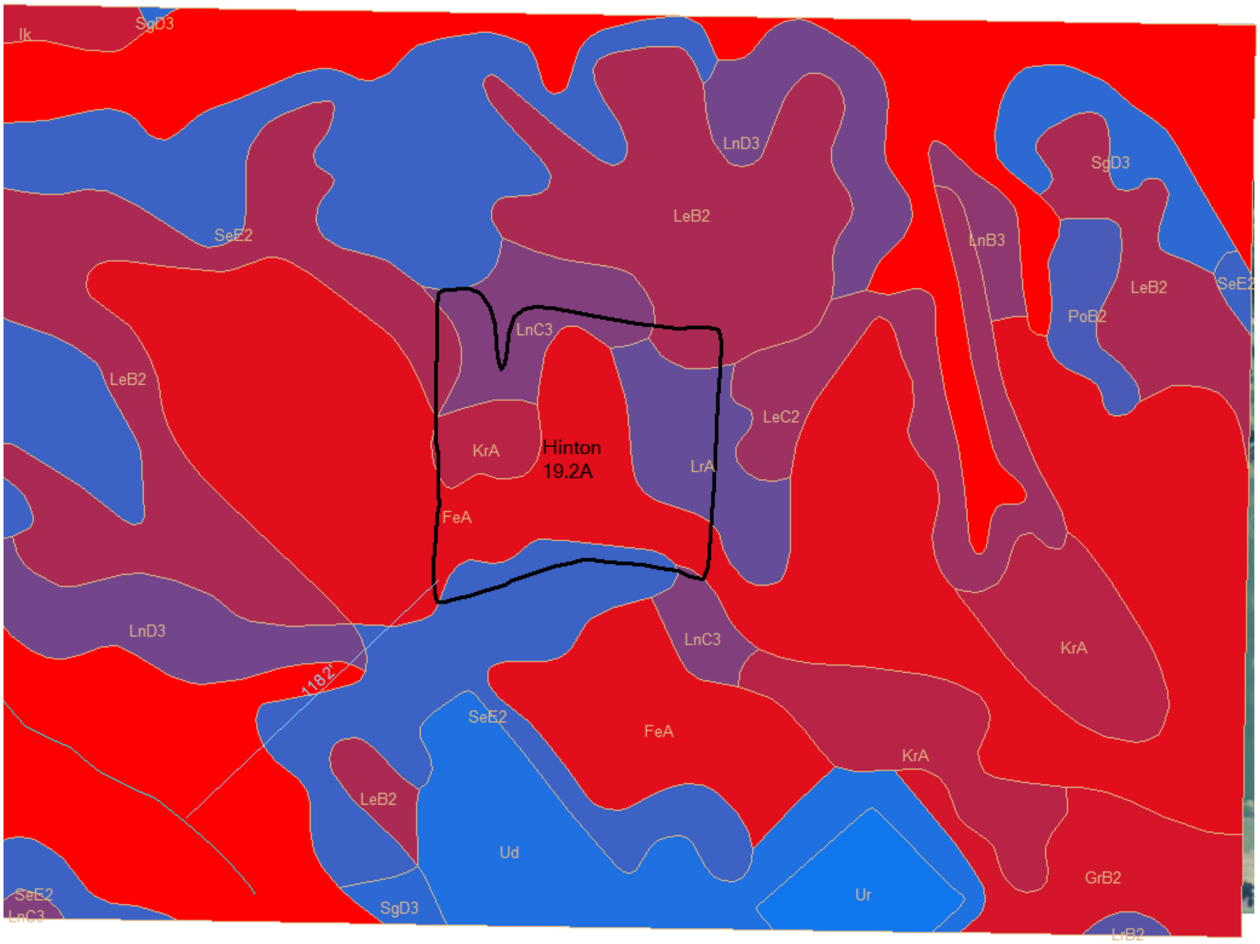


Topo Map





Soil Map



Ik
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LnD3
SgD3
SeE2
LeB2
LnB3
LeB2
SeE2
PoB2
LnC3
LeB2
LeC2
KrA
Hinton
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LrA
FeA
LnD3
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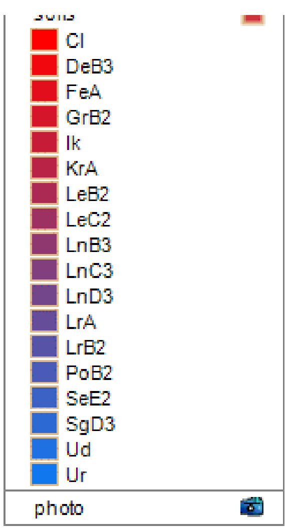
SgD3
LrB2



Cl
DeB3
FeA
GrB2
Ik
KrA
LeB2
LeC2
LnB3
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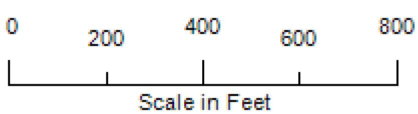
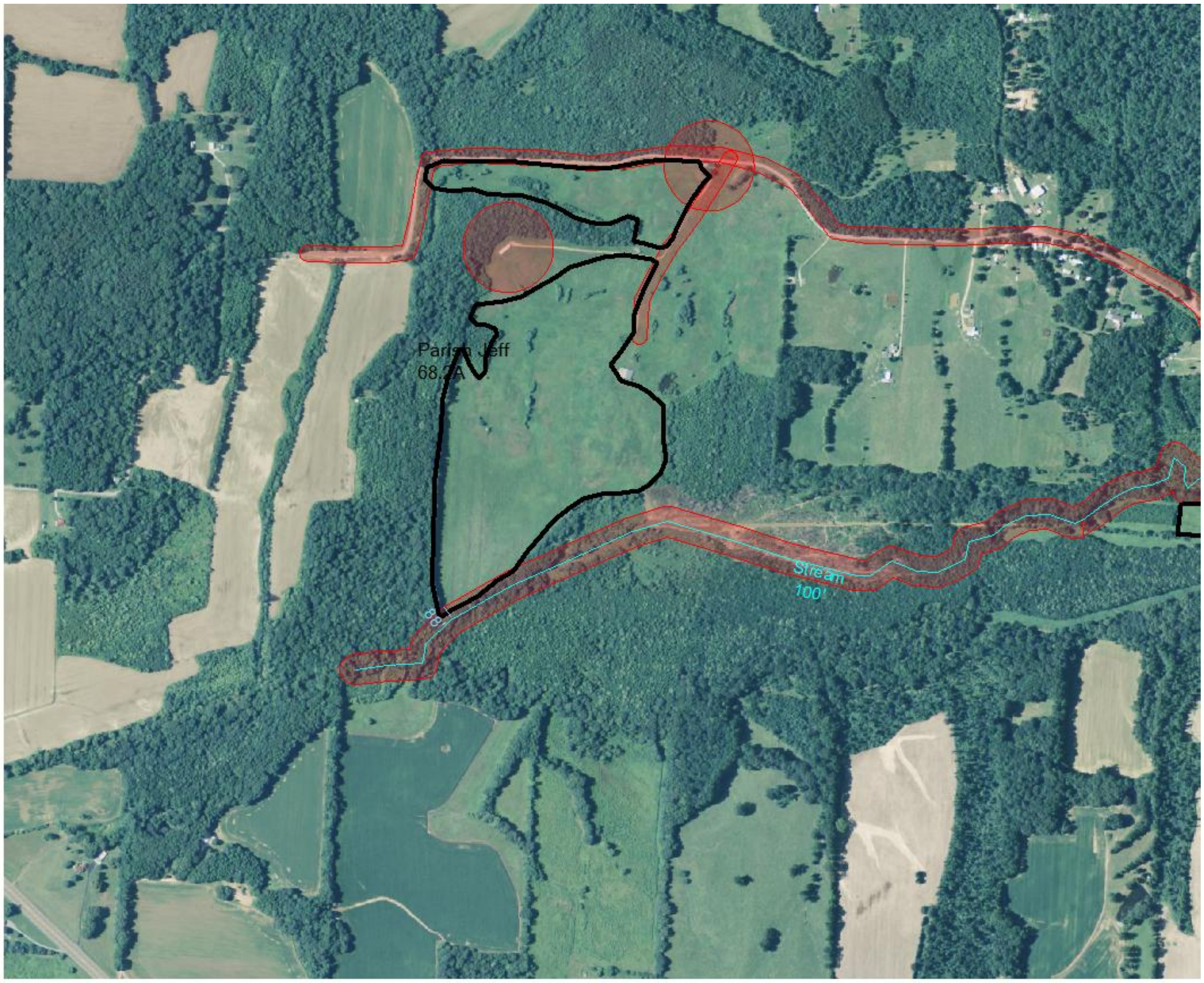
LnD3
LrA
LrB2
PoB2
SeE2
SgD3
Ud
Ur
photo

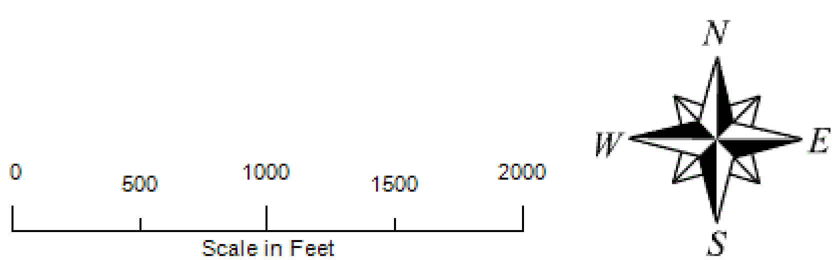


0
200
400
600
800
Scale in Feet

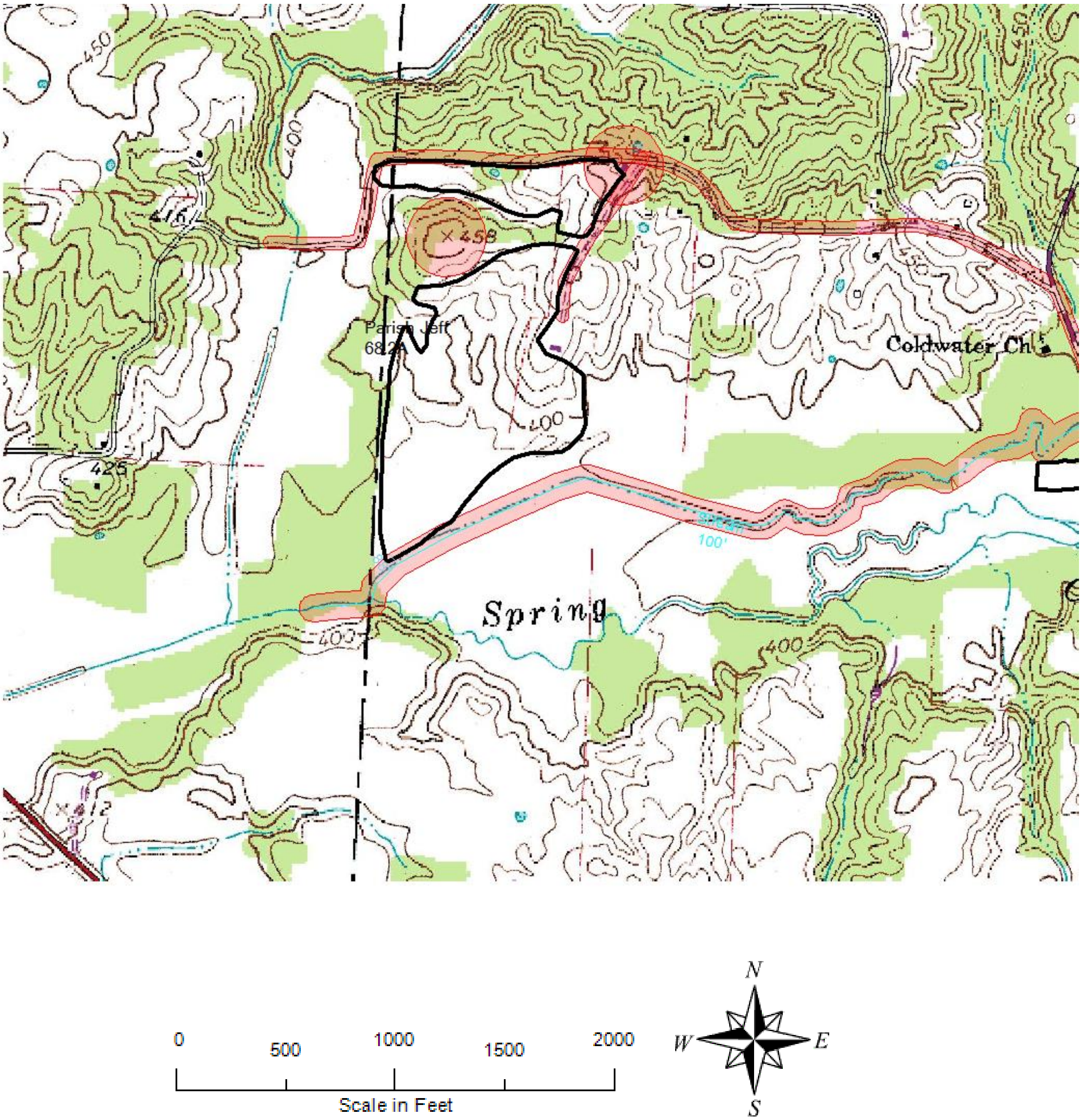
N
W
E
S

Map with Setbacks

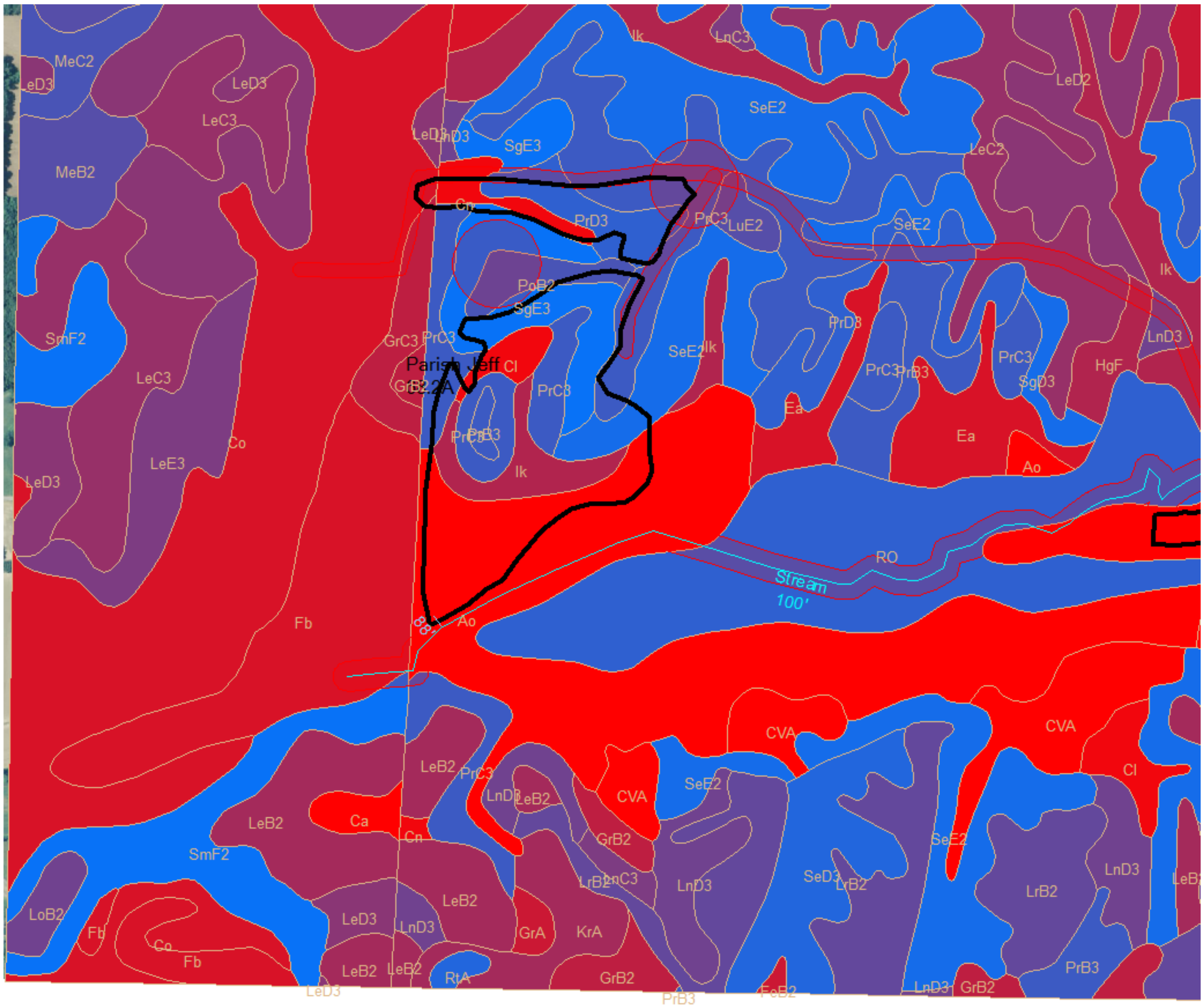




Topo Map

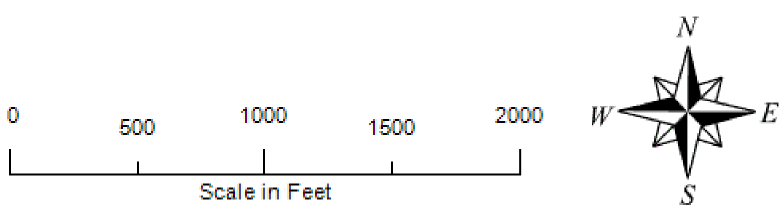

Coldwater Ch
Spring
458
425
400
450
0
500
1000
1500
2000
Scale in Feet
N
W
E
S

Soil Map

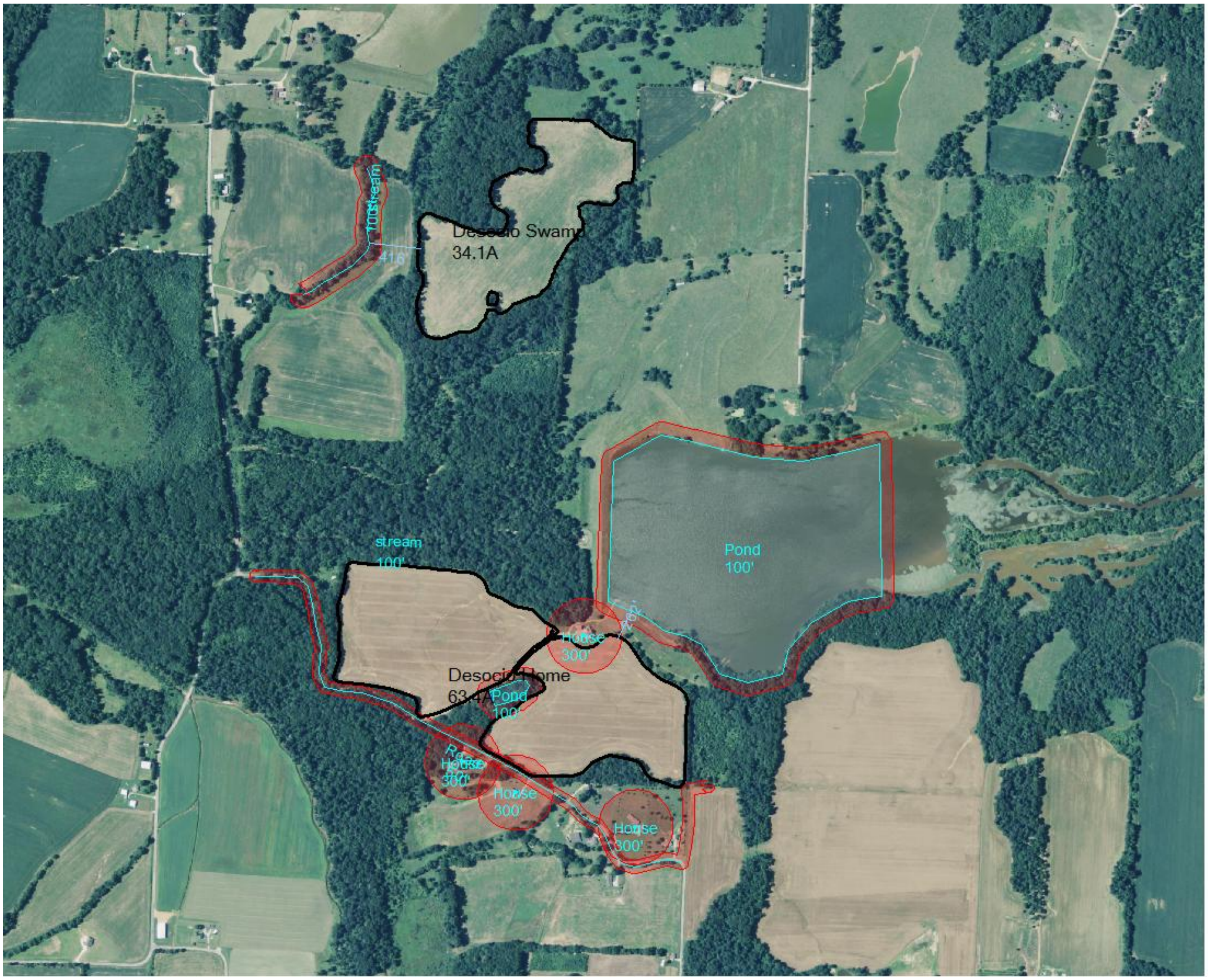


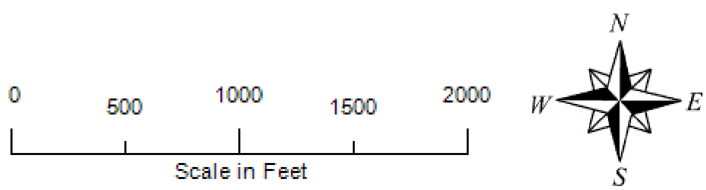
soils
- Ak - Ca
- Ca - Cn
- Cn - CVA
- CVA - Fb
- Fb - GrA
- GrA - GrC3
- GrC3 - Ik
- Ik - LeB2
- LeB2 - LeC3
- LeC3 - LeD3
- LeD3 - LnC3
- LnC3 - LoB2
- LoB2 - LrB2
- LrB2 - MeB2
- MeB2 - PoB2
- PoB2 - PrC3
- PrC3 - RO
- RO - SeD3
- SeD3 - SgD3
- SgD3 - SmF2

photo

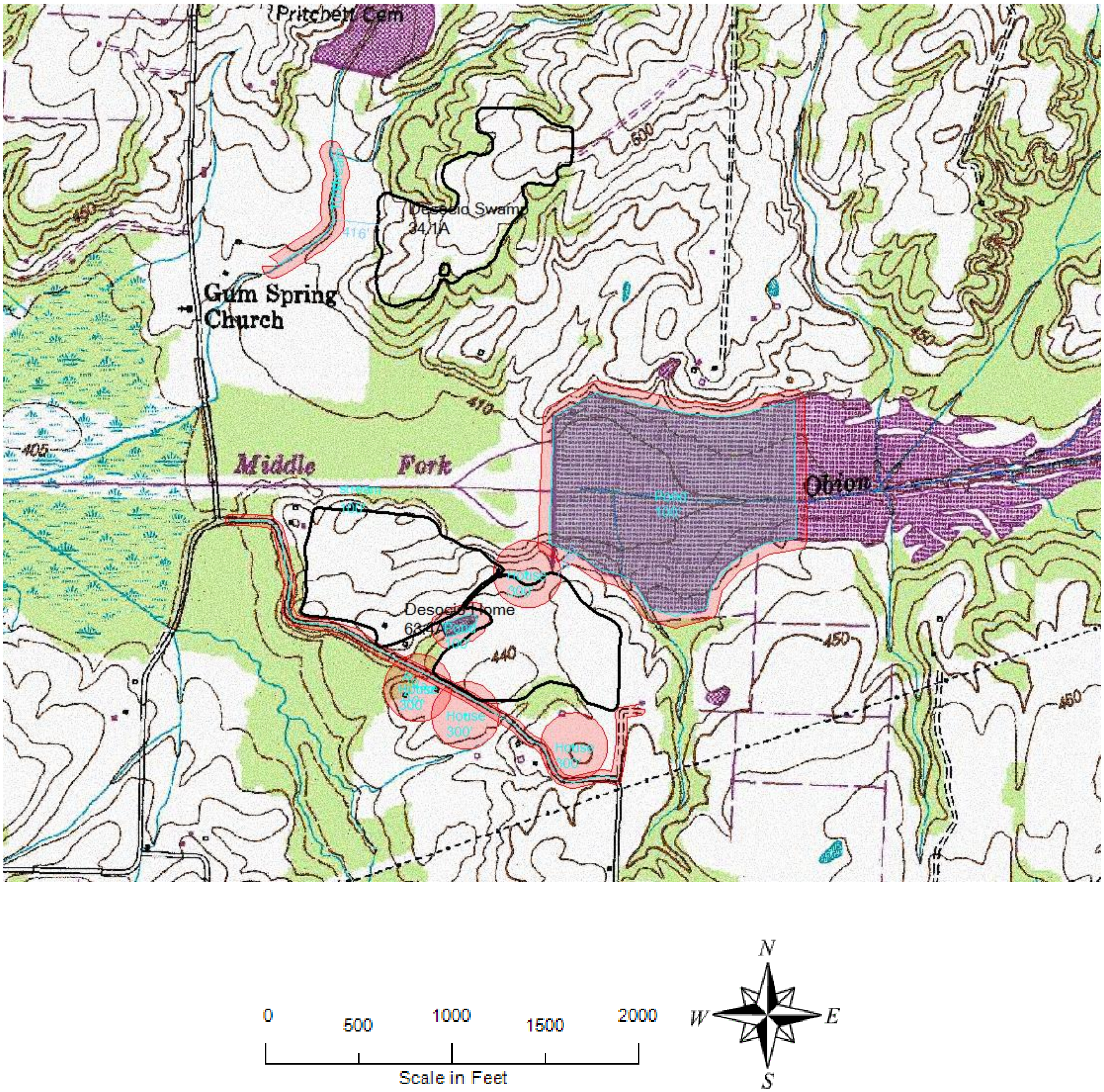


Field with Setbacks

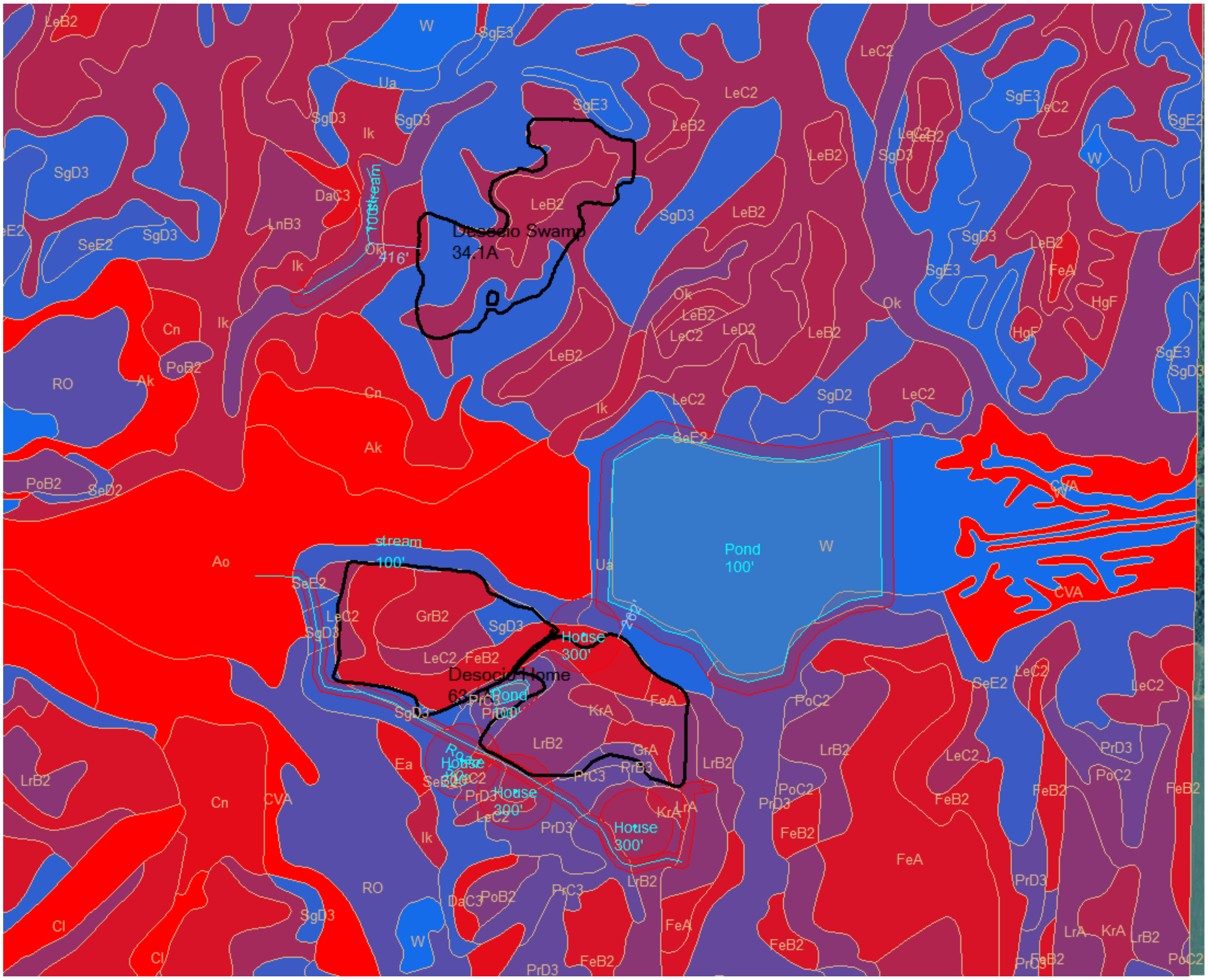




Topo Map


Pritchett Cem
Gum Spring
Church
Middle
Fork
Obion
450
410
405
440
450
Desocio Home
Scale in Feet
0
500
1000
1500
2000
N
S
E
W

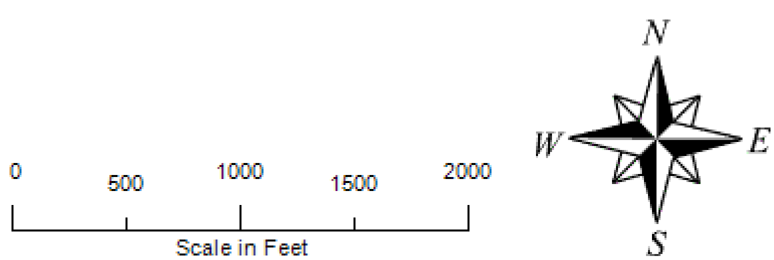
Soil Map



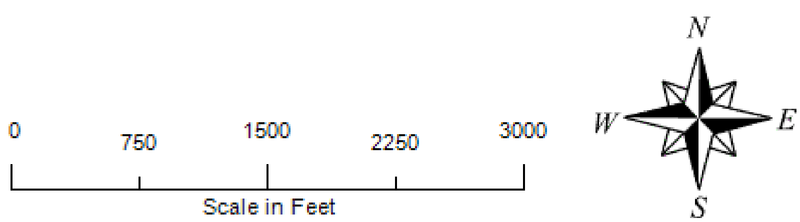
soils
- Ak - Cl
- Cl - CVA
- CVA - Ea
- Ea - FeB2
- FeB2 - GrB2
- GrB2 - Ik
- Ik - LeB2
- LeB2 - LeD2
- LeD2 - LnC3
- LnC3 - LrB2
- LrB2 - PoB2
- PoB2 - PrB3
- PrB3 - PrD3
- PrD3 - RuA
- RuA - SeD3
- SeD3 - SgD2
- SgD2 - SgE2
- SgE2 - Ua
- Ua - W

watershed

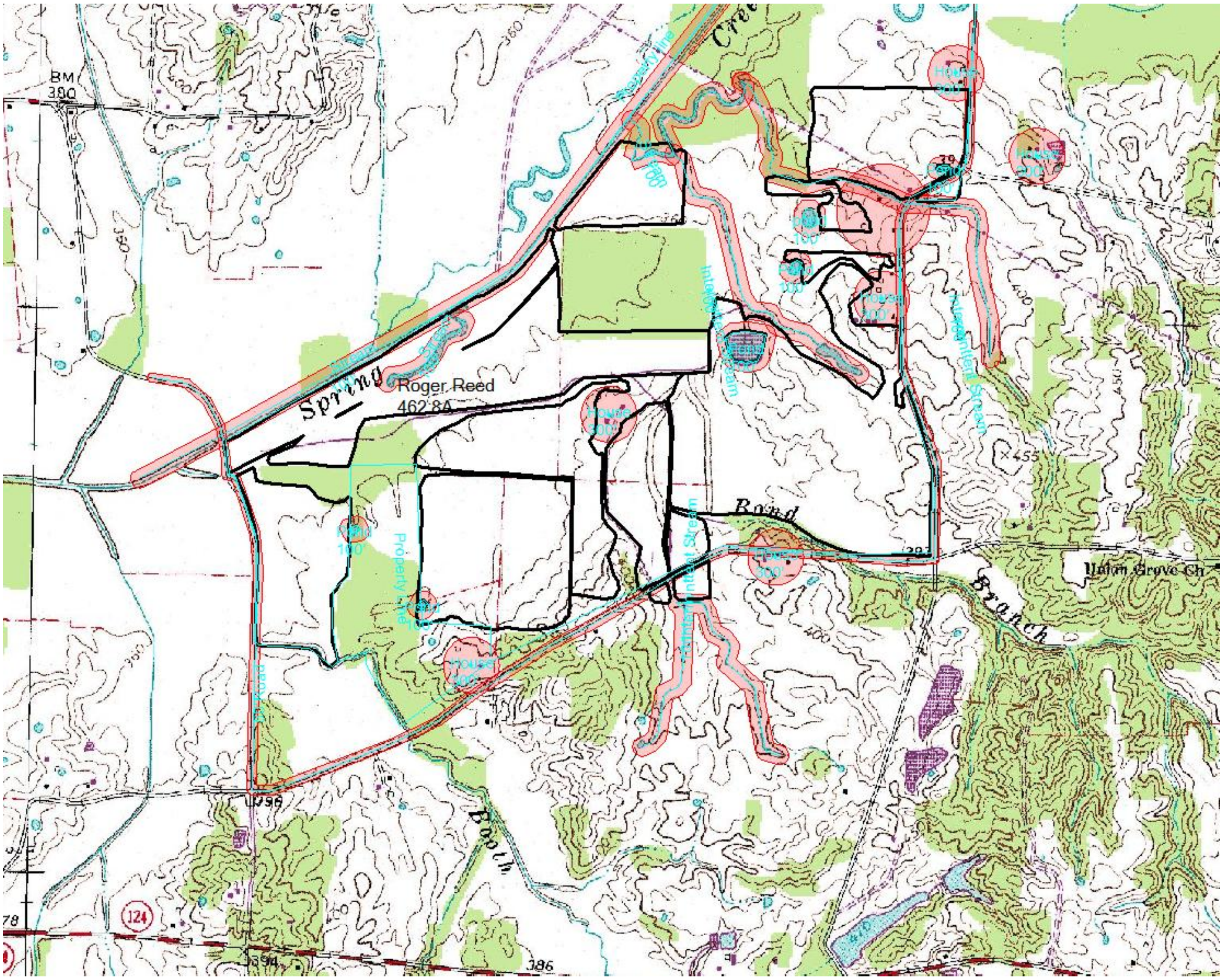
photo



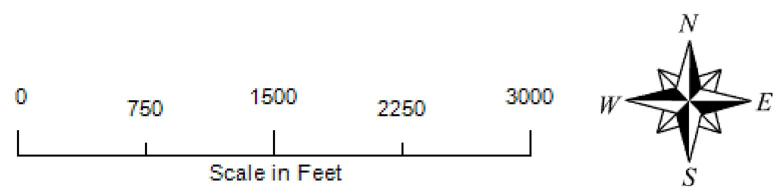
Map with setbacks



Topo Map

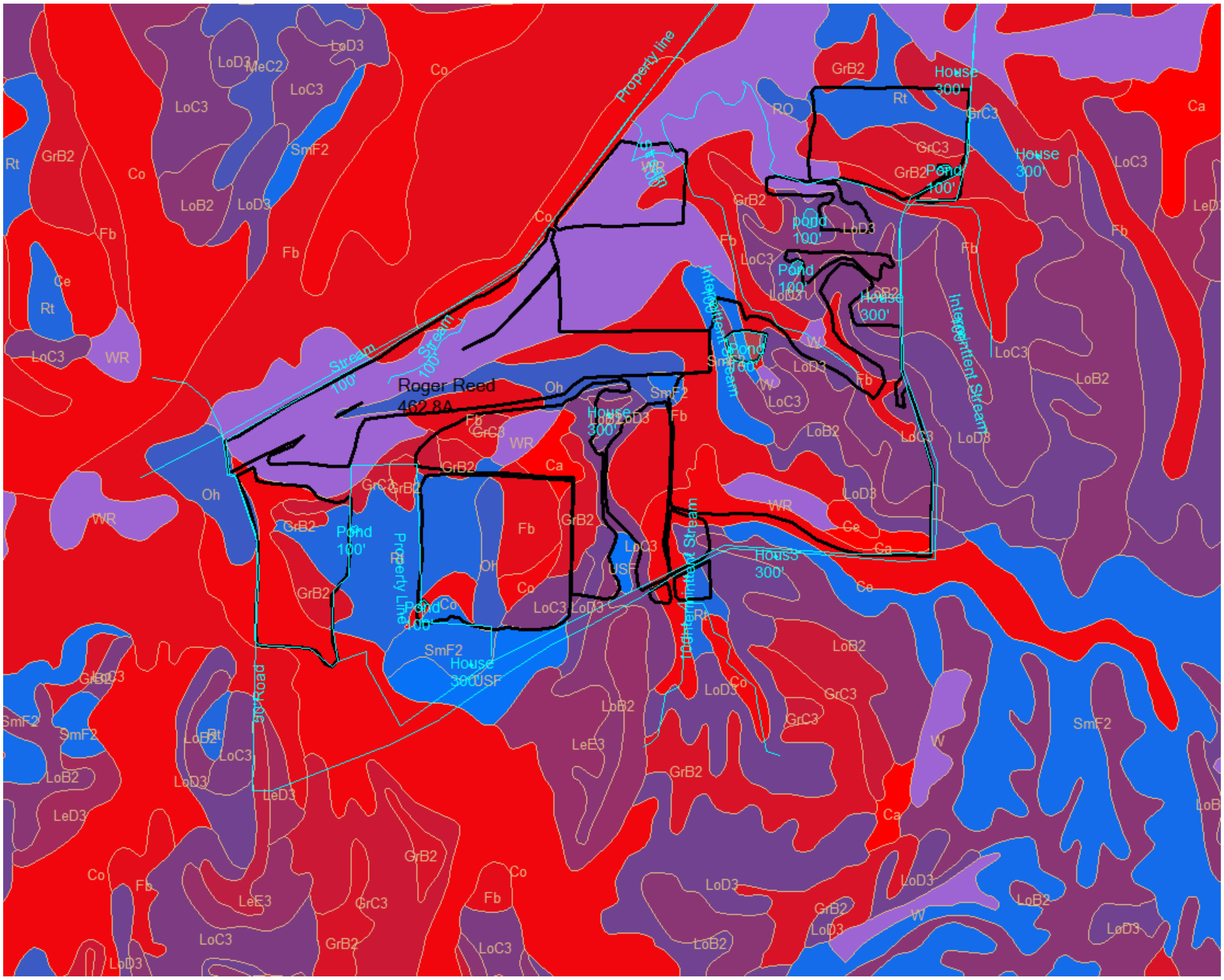


Roger Reed
462.8A
Spring
Road
Branch
Union Grove Ch



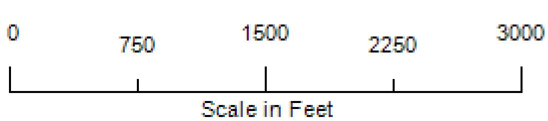
0
750
1500
2250
3000
Scale in Feet
N
E
S
W

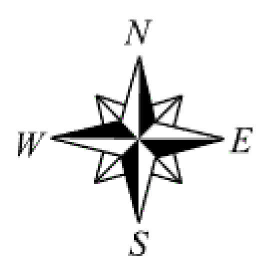
Soil Map



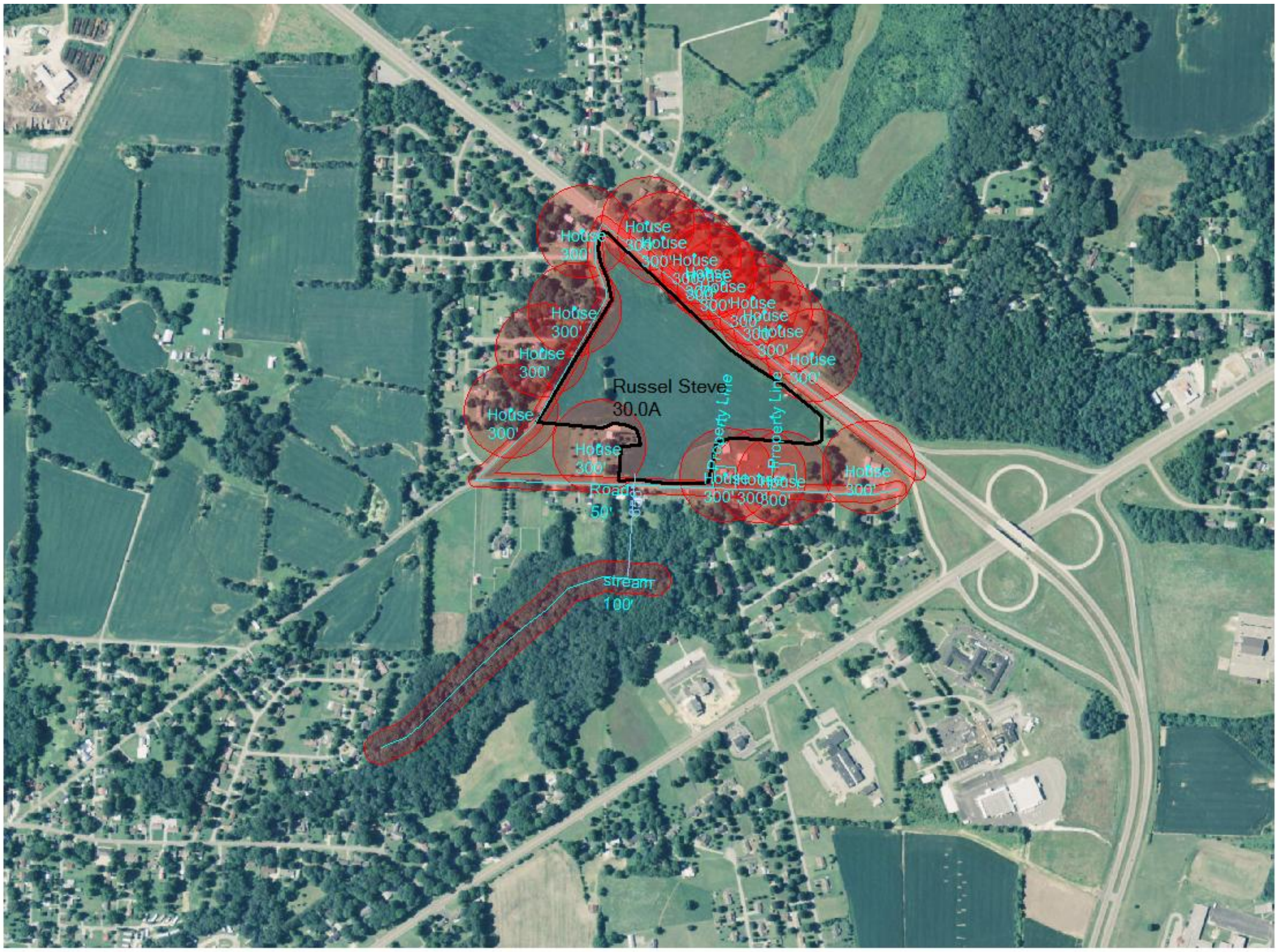
soils
- Ca
- Ce - Co
- Co - Fb
- Fb - GrB2
- GrB2 - GrC3
- GrC3 - LeB2
- LeB2 - LeC3
- LeC3 - LeD3
- LeD3 - LeE3
- LeE3 - LoB2
- LoB2 - LoC3
- LoC3 - LoD3
- LoD3 - LoE3
- LoE3 - MeB2
- MeB2 - MeC2
- MeC2 - Oh
- Oh - RO
- RO - Rt
- Rt - SmF2
- SmF2 - USF

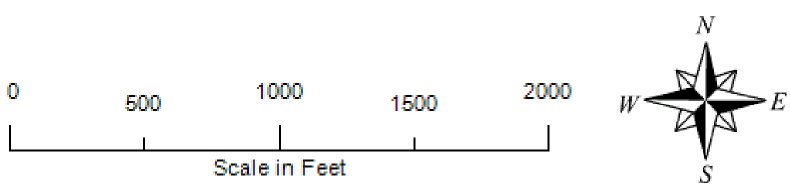
photo



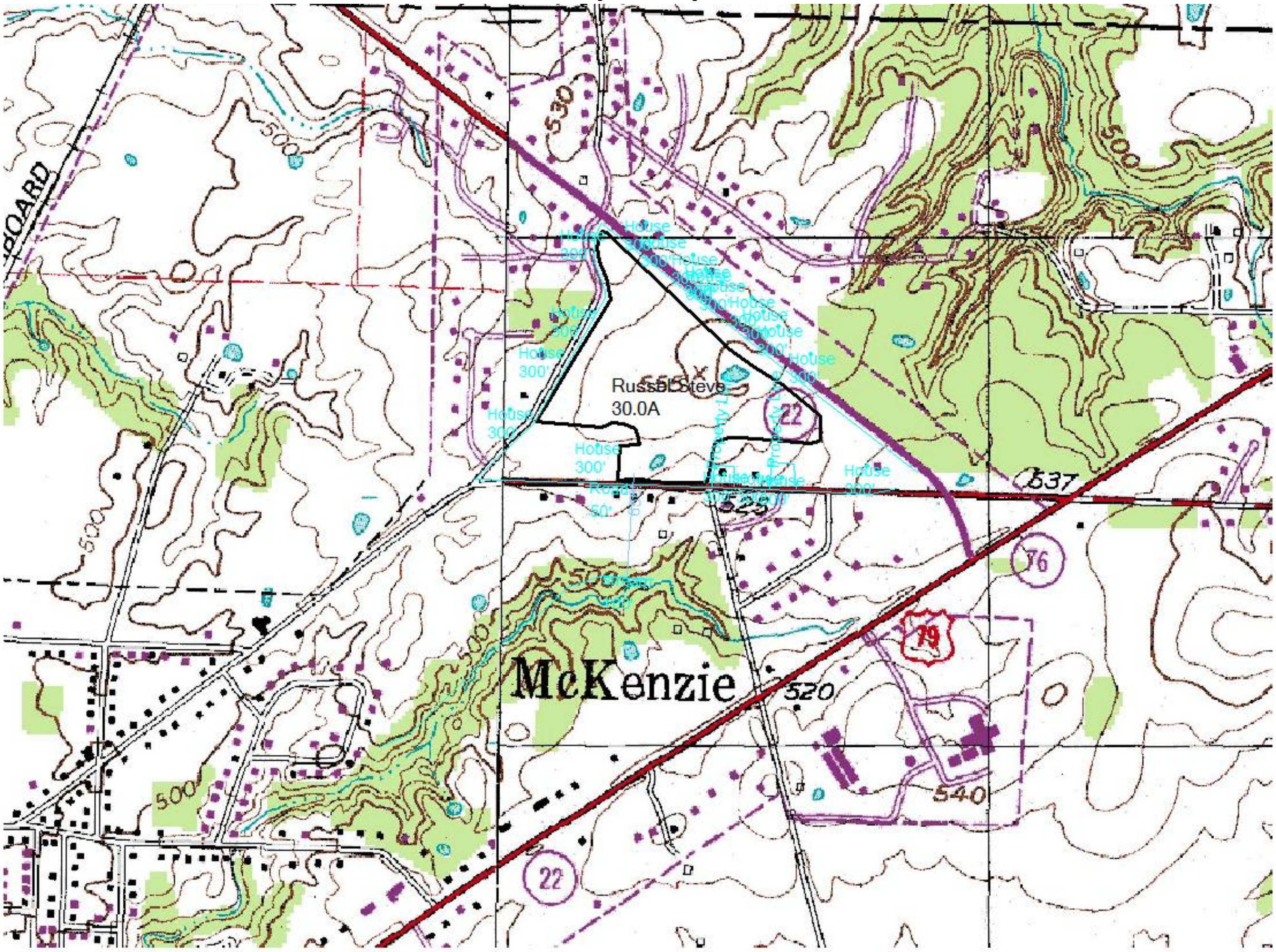


Field with setbacks

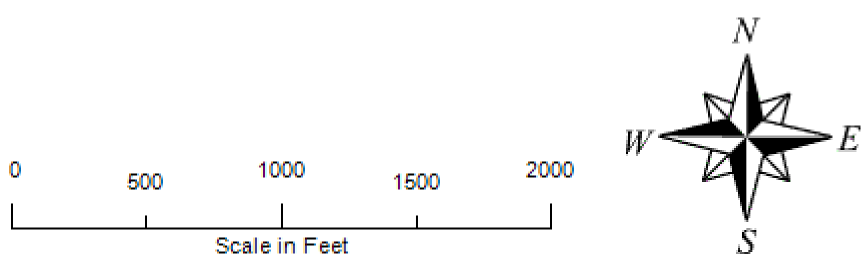




Topo Map

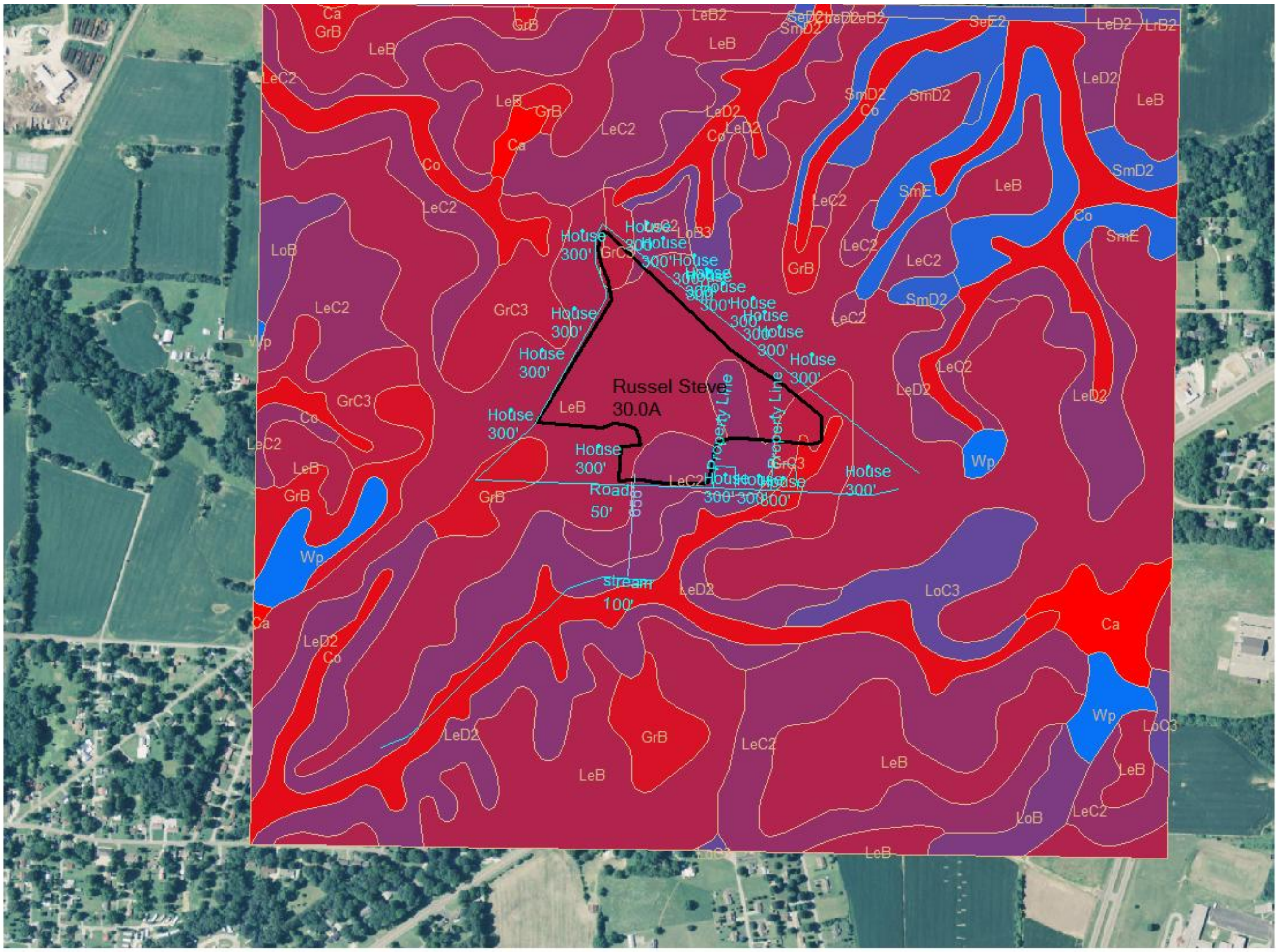


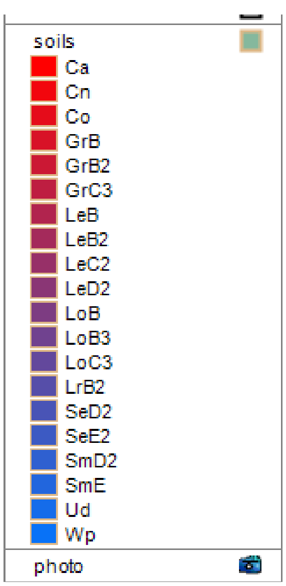
Russell Steve
30.0A
McKenzie

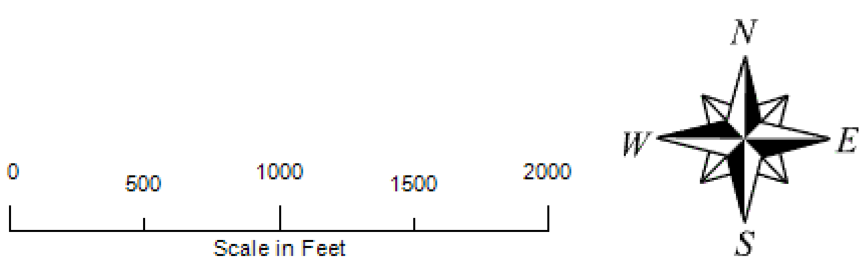


0
500
1000
1500
2000
Scale in Feet
N
W
E
S

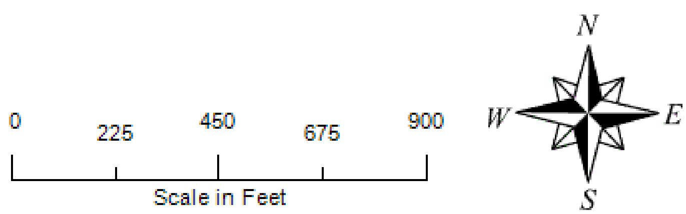
Soil Map


Russel Steve
30.0A
Property Line
Property Line
House
300'
Road
50'
stream
100'
LeB
LeC2
LeD2
GrB
GrC3
Ca
Co
LoB
LoC3
SmD2
SmE
Wp

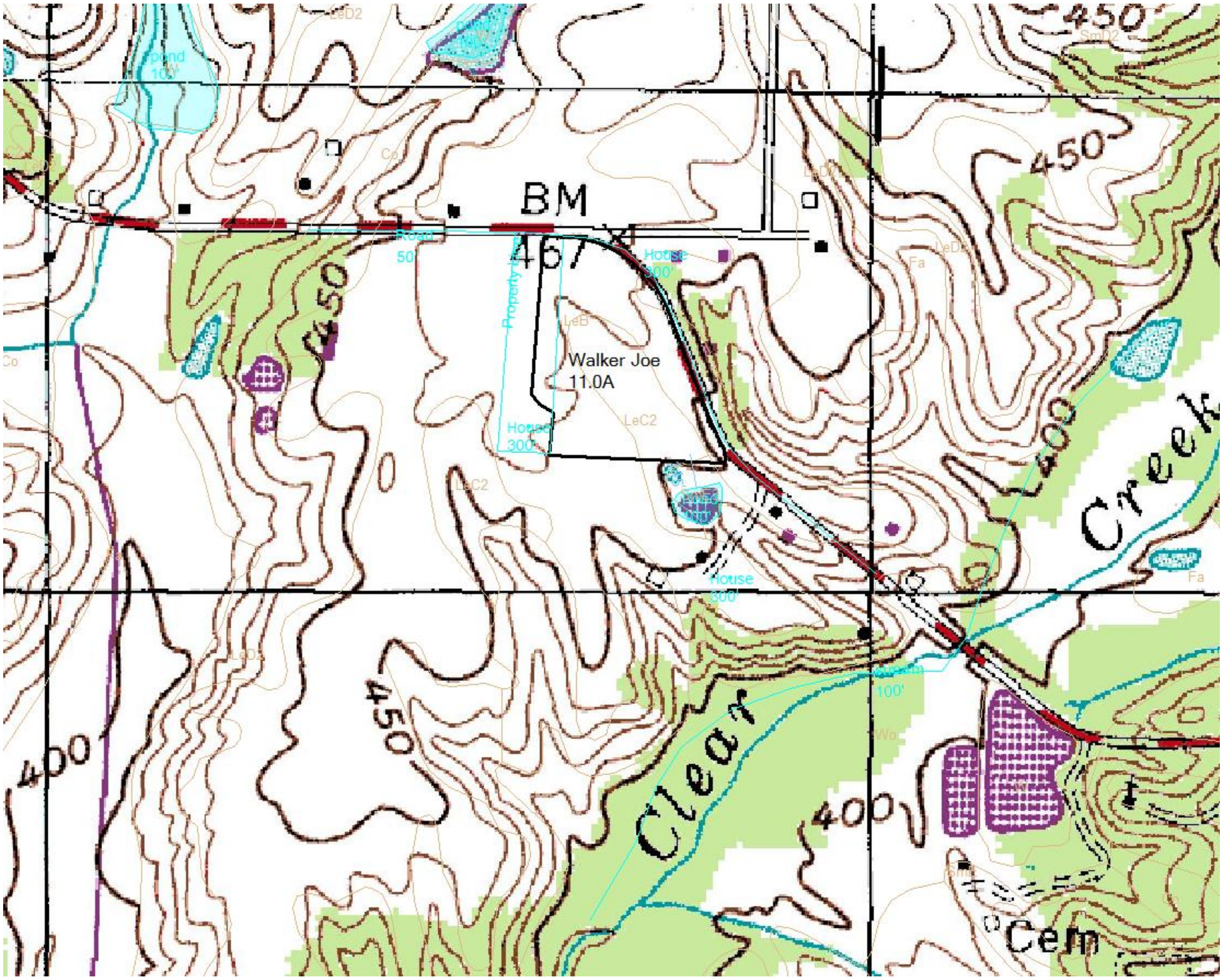

soils
Ca
Cn
Co
GrB
GrB2
GrC3
LeB
LeB2
LeC2
LeD2
LoB
LoB3
LoC3
LrB2
SeD2
SeE2
SmD2
SmE
Ud
Wp
photo

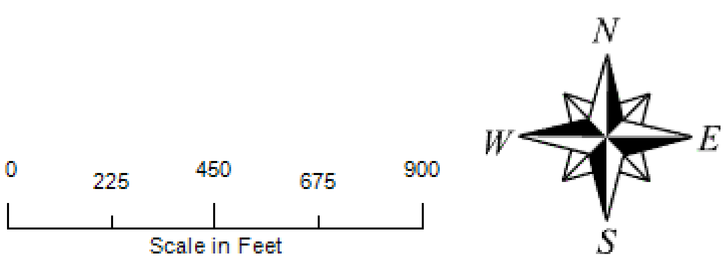

0
500
1000
1500
2000
Scale in Feet
N
W
E
S

Field with Setbacks

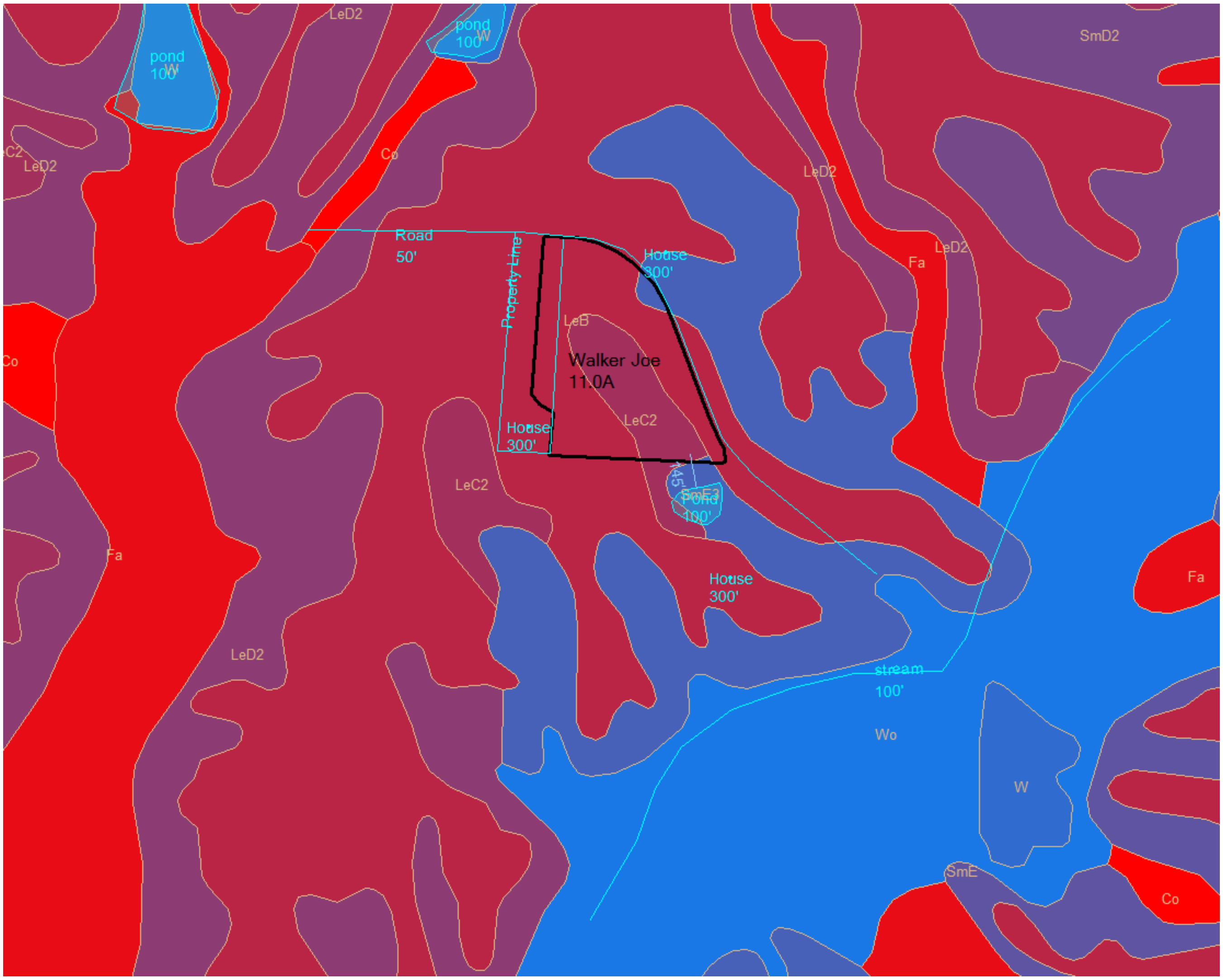


Topo Map

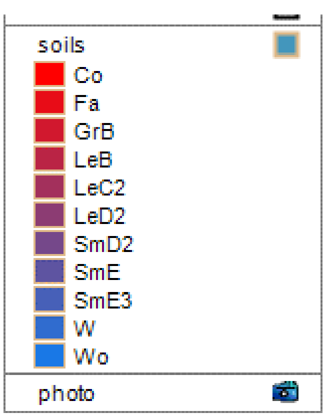

BM
467
Walker Joe
11.0A
House
300'
Road
50'
450
400
Clear
Creek
Cem
LeC2
LeB
Fa
Co
Wd


0
225
450
675
900
Scale in Feet
N
E
S
W

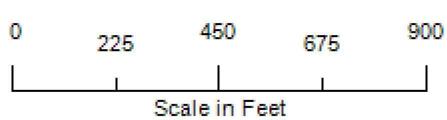
Soil Map



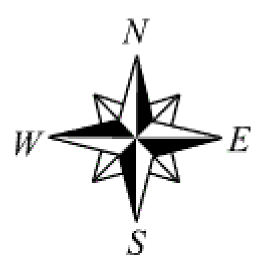
LeD2
pond
100'
Co
Road
50'
Property Line
House
300'
LeB
Walker Joe
11.0A
LeC2
Fa
SmD2
stream
100'
Wo
W
SmE



soils
Co
Fa
GrB
LeB
LeC2
LeD2
SmD2
SmE
SmE3
W
Wo
photo



0
225
450
675
900
Scale in Feet



N
W
E
S

Henry County, Tennessee

Map Unit: Cl—Cascilla silt loam, 0 to 3 percent slopes, rarely flooded

Component: Cascilla (95%)

The Cascilla component makes up 95 percent of the map unit. Slopes are 0 to 3 percent. This component is on flood plains on uplands. The parent material consists of silty alluvium over loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is rarely flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 1. This soil does not meet hydric criteria.

Component: Chenneby (5%)

The Chenneby component makes up 93 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains. The parent material consists of silty alluvium over loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 21 inches during January, February, March. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map Unit: DaC3—Deanburg clay loam, 5 to 8 percent slopes, severely eroded

Component: Deanburg (95%)

The Deanburg component makes up 95 percent of the map unit. Slopes are 5 to 8 percent. This component is on divides on uplands. The parent material consists of loamy eolian deposits over sandy eolian deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Component: Providence (5%)

Generated brief soil descriptions are created for major components. The Providence soil is a minor component.

Map Unit: FeB2—Feliciana silt loam, 2 to 5 percent slopes, eroded

Component: Feliciana (92%)

The Feliciana component makes up 92 percent of the map unit. Slopes are 2 to 5 percent. This component is on divides on silty uplands. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Loring (8%)

Generated brief soil descriptions are created for major components. The Loring soil is a minor component.

Map Unit: GrB2—Grenada silt loam, 2 to 5 percent slopes, eroded

Component: Grenada (99%)

The Grenada component makes up 99 percent of the map unit. Slopes are 2 to 5 percent. This component is on divides on silty uplands. The parent material consists of loess. Depth to a root restrictive layer, fragipan, is 20 to 36 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Calloway (1%)

Generated brief soil descriptions are created for major components. The Calloway soil is a minor component.

Map Unit: HgF—Hapludults-Gullied land complex, very steep

Component: Hapludults (60%)

The Hapludults component makes up 60 percent of the map unit. Slopes are 0 to 45 percent. This component is on uplands, fills. The parent material consists of loess and/or loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.

Component: Gullied land (40%)

Generated brief soil descriptions are created for major soil components. The Gullied land is a miscellaneous area.

Map Unit: Ik—Iuka loam, 0 to 2 percent slopes, occasionally flooded

Component: Iuka (89%)

The Iuka component makes up 89 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains on uplands. The parent material consists of coarse-loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 30 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Component: Enville (6%)

Generated brief soil descriptions are created for major components. The Enville soil is a minor component.

Component: Chenneby (5%)

Generated brief soil descriptions are created for major components. The Chenneby soil is a minor component.

Map Unit: KrA—Kurk silt loam, 0 to 3 percent slopes

Component: Kurk (95%)

The Kurk component makes up 95 percent of the map unit. Slopes are 0 to 3 percent. This component is on terraces on silty uplands. The parent material consists of loess over loamy fluviomarine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 10 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Component: Routon (5%)

Generated brief soil descriptions are created for major components. The Routon soil is a minor component.

Map Unit: LeB2—Lexington silt loam, 2 to 5 percent slopes, eroded

Component: Lexington (94%)

The Lexington component makes up 94 percent of the map unit. Slopes are 2 to 5 percent. This component is on divides on silty uplands. The parent material consists of loess over marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Providence (6%)

Generated brief soil descriptions are created for major components. The Providence soil is a minor component.

Map Unit: LeC2—Lexington silt loam, 5 to 8 percent slopes, eroded

Component: Lexington (95%)

The Lexington component makes up 95 percent of the map unit. Slopes are 5 to 8 percent. This component is on divides on silty uplands. The parent material consists of loess over marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Component: Providence (5%)

Generated brief soil descriptions are created for major components. The Providence soil is a minor component.

Map Unit: LeD2—Lexington silt loam, 8 to 12 percent slopes, eroded

Component: Lexington (97%)

The Lexington component makes up 97 percent of the map unit. Slopes are 8 to 12 percent. This component is on divides on silty uplands. The parent material consists of loess over marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Component: Providence (3%)

Generated brief soil descriptions are created for major components. The Providence soil is a minor component.

Map Unit: LnB3—Lexington silty clay loam, 2 to 5 percent slopes, severely eroded

Component: Lexington (95%)

The Lexington component makes up 95 percent of the map unit. Slopes are 2 to 5 percent. This component is on divides on silty uplands. The parent material consists of loess over marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Component: Providence (5%)

Generated brief soil descriptions are created for major components. The Providence soil is a minor component.

Map Unit: LnC3—Lexington silty clay loam, 5 to 8 percent slopes, severely eroded

Component: Lexington (95%)

The Lexington component makes up 95 percent of the map unit. Slopes are 5 to 8 percent. This component is on divides on silty uplands. The parent material consists of loess over marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Component: Providence (5%)

Generated brief soil descriptions are created for major components. The Providence soil is a minor component.

Map Unit: LnD3—Lexington silty clay loam, 8 to 12 percent slopes, severely eroded

Component: Lexington (97%)

The Lexington component makes up 97 percent of the map unit. Slopes are 8 to 12 percent. This component is on divides on silty uplands. The parent material consists of loess over marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria.

Component: Providence (3%)

Generated brief soil descriptions are created for major components. The Providence soil is a minor component.

Map Unit: LrB2—Loring silt loam, 2 to 5 percent slopes, eroded

Component: Loring (95%)

The Loring component makes up 95 percent of the map unit. Slopes are 2 to 5 percent. This component is on divides on silty uplands. The parent material consists of loess over loamy marine deposits. Depth to a root restrictive layer, fragipan, is 20 to 32 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 23 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Calloway (5%)

Generated brief soil descriptions are created for major components. The Calloway soil is a minor component.

Map Unit: PrB3—Providence silty clay loam, 2 to 5 percent slopes, severely eroded

Component: Providence (100%)

The Providence component makes up 100 percent of the map unit. Slopes are 2 to 5 percent. This component is on divides on silty uplands. The parent material consists of loess over loamy marine deposits. Depth to a root restrictive layer, fragipan, is 12 to 18 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 11 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Map Unit: PrC3—Providence silty clay loam, 5 to 8 percent slopes, severely eroded

Component: Providence (100%)

The Providence component makes up 100 percent of the map unit. Slopes are 5 to 8 percent. This component is on divides on silty uplands. The parent material consists of loess over loamy marine deposits. Depth to a root restrictive layer, fragipan, is 12 to 18 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 11 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Map Unit: SeE2—Smithdale loam, 12 to 25 percent slopes, eroded

Component: Smithdale (100%)

The Smithdale component makes up 100 percent of the map unit. Slopes are 12 to 25 percent. This component is on hills on uplands. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria.

Map Unit: SgD3—Smithdale-Lexington complex, 8 to 12 percent slopes, severely eroded

Component: Smithdale (67%)

The Smithdale component makes up 67 percent of the map unit. Slopes are 8 to 12 percent. This component is on hills on uplands. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria.

Component: Lexington (33%)

The Lexington component makes up 33 percent of the map unit. Slopes are 8 to 12 percent. This component is on hills on silty uplands. The parent material consists of loess over marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria.

2.2. Crop and Pasture Conservation Practices -- Record of Decisions

Conservation Crop Rotation (328)

Grow crops in a recurring sequence in the same field. Develop crop rotation program for Corn - Soybeans. See Practice Standard 328.

Field(s)	Planned amount (Ac)	Month	Year	Amount Applied	Date
Crutchfield	166.9	6	2017		
Desocio C Bar	34.1	6	2017		
Desocio Heav	20.2	6	2017		
Desocio Owen	45.2	6	2017		
Desocio Home	58.5	6	2017		
Desocio Swamp	34.1	6	2017		
Rancho	130.6	6	2017		
Hinton	18.1	6	2017		
Parish Jeff	65.3	6	2017		
Roger Reed	419.5	6	2017		
Russel Steve	22.1	6	2017		
Walker Joe	7.1	6	2017		
TOTAL	**1022**				

Nutrient Management (590)

Soil amendments, animal waste, and lime will be applied according to soil test recommendations. When applying animal waste, recommended buffer widths shall be observed. Refer to Practice Standard 590.

Ongoing: Use of rotation, application of manure and commercial fertilizer/ lime according to soil test results from a Tn accredited lab.

Field(s)	Planned amount (Ac)	Month	Year	Amount Applied	Date
Crutchfield	166.9	6	2017		

Desocio C Bar	34.1	6	2017		
Desocio Heav	20.2	6	2017		
Desocio Owen	45.2	6	2017		
Desocio Home	58.5	6	2017		
Desocio Swamp	34.1	6	2017		
Rancho	130.6	6	2017		
Hinton	18.1	6	2017		
Parish Jeff	65.3	6	2017		
Roger Reed	419.5	6	2017		
Russel Steve	22.1	6	2017		
Walker Joe	7.1	6	2017		
TOTAL	**1022**				

Manure needs to be tested each time an application occurs if manure test varies from this document, make adjustments to application rate.

All NRCS conservation practices shall be installed, operated and maintained according to NRCS conservation practice standards and associated technical specifications.

2.3. Crop and Pasture Conservation Practices – Implementation Requirements

Sampling Farm Fields

Divide fields to be sampled into production areas (of 10 acres or less) based on uniform soil type, fertilization and management history. Sandy or eroded areas, and problem areas of obviously different plant growth responses should also be sampled separately -- provided the area is sufficiently large enough to be treated differently with lime or fertilizer.

From your local county Extension office, obtain a soil sample box for **each** production area, and submit a Soil and Media Test Information Sheet,* for each **ten** production areas.

For each production area that you have identified:

1. Collect a composite soil sample by moving through the area in a zig-zag pattern; sampling at a minimum of 20 locations. This sampling procedure should be random with respect to any existing cropping row. In continuous no-till production fields, be sure to vary distance from the row for each sub-sample collected. In continuous no-till fields or where fertilizer has been banded, increasing the number of sub-samples to 30 or 40 will increase precision of the results.

2. Move surface litter aside. Each sub-sample should be obtained by using a soil tube, trowel or spade. For determination of plant nutrients, take soil samples to a depth of 6 inches. For organic matter determination, sample to the depth of 2 inches.

3. Combine each sub-sample in a clean bucket as you move through the production area. Do not use a galvanized bucket if Zn is to be determined. Thoroughly mix the sub-samples into one composite sample. If the soil is exceptionally wet, you may have to let it air dry on a paper plate before it can be properly mixed (wet soil can also dramatically increase shipping costs and weaken shipping containers). DO NOT use heat to dry a soil sample as heat may change your results.

4. From this composite sample remove enough soil (about a cup) to fill a soil sample box. Adequately mark the box to identify the selected production area location represented by that soil sample and keep this record in a safe place for later referral.

5. For the PSNT soil test, sample to a depth of 12 inches when corn is 6 to 12 inches tall. Height should be measured from the ground to bottom of the whorl (4-6 fully mature leaves present).

6. For container media analysis, medium should be sampled before posting by removing several portions from the mix and blending thoroughly. For established plantings, select 8 to 10 pots that are representative of the medium used. Scrape away the top one-fourth inch of each pot including slow-release fertilizer pellets and discard. Mix samples being careful not to crush any remaining fertilizer pellets. Completely fill **two** soil sample boxes for container media analysis.

Send soil sample(s), Soil and Media Information Sheet(s), and appropriate fees to the Soil, Plant and Pest Center (see address and fee information on the Soil and Media Information Sheet). Fees can also be paid by credit card using the secure UT Institute of Agriculture eMarketplace site. Click here to pay online.

Livestock Waste Management and Conservation

Procedures for Manure and Litter Sampling

(Class I & II – Large and Medium CAFOs)

Tennessee CAFO Factsheet #14

Kristy M. Hill, Extension Dairy Specialist
Animal Science Department

Nutrient composition of manure varies with a number of factors, including animal type, bedding, ration, storage and handling, environmental conditions, field application method, age of manure, timing of sampling and sampling technique. This variability makes book values (or averages) an unreliable source for determining application rates of nitrogen, phosphorus and potassium. Each livestock production operation and manure management system is unique, and an individual farm's manure analysis can vary from average values by 50 percent or more. Testing manure may better indicate how animal management and other factors actually affect nutrient contents and will allow for more accurate calculation of application rates.

The results of a manure analysis are only as reliable as the sample taken. A representative sample is needed to accurately reflect the nutrient content. However, obtaining a representative sample can be a challenge as manure nutrient content is not uniform within storage structures. Mixing and sampling strategies can insure that samples more accurately reflect the type of manure that will be applied.

When to Sample

The ideal time to sample manure is prior to application to ensure that results of the analysis are received in time to adjust nutrient application rates. However, do not allow long periods of time to pass before application begins, because there can be storage and handling losses over time. Sampling several days to a week prior to application is best. However, a complication of the timing of the sampling is that semi-solid (or slurry) manure should be well agitated before sampling, and in many situations, such as contracting waste application to a third party, agitators or other necessary equipment are not available until application begins. In cases such as this, "pre-sampling" (dipping samples off the top of the storage structure for N and K concentrations) can be used to estimate application rates (See page 4 for more info on pre-sampling).

Building a "bank" of manure analysis over time can be quite useful in the future as long as animal management practices, feed rations or manure storage and handling methods do not drastically change from present methods. If samples do not vary greatly from year to year or are consistent during spring or fall applications, the "bank" averages will help estimate application rates if an analysis cannot be performed prior to application.

Safety Precautions

It is more dangerous and more difficult to sample from liquid storage facilities than dry-manure systems. Proper precautions should be taken to prevent accidents, such as falling into the storage facility or being overcome by manure gases.

1. Have two people present at all times;
2. Never enter confined manure-storage spaces without appropriate safety gear, such as a self-contained breathing apparatus;
3. When agitating a storage pit below a building, be sure to provide adequate ventilation for both humans and animals; and
4. When agitating outdoor pits, monitor activities closely to prevent erosion of berms or destruction of pit liners.

Sample Preparations

1. Check with the laboratory performing the analysis, as most of these labs have plastic bottles available for liquid sample collection or sealable plastic bags for dry samples (freezer bags work well). Additionally, they may have specific sample collection procedures, including holding times, refrigeration and shipping requirements.
2. Do not use glass containers, as expansion of the gases in the sample can cause the container to break.
3. Never use galvanized containers for collection or mixing due to the risk of contamination from metals like zinc in the container.
4. When taking liquid samples from facilities spreading both effluent and solids, the manure should be agitated for two to four hours before taking the sample.
5. Liquid samples can be taken during agitation (after two to four hours have passed) because most agitation equipment is effective 75 to 100 feet away from the equipment.
6. Take multiple samples from the storage facility and mix them together thoroughly in a larger bucket to obtain a representative sample. For liquid or semi-solid samples, use a stirring rod to get the solids spinning in suspension and collect the representative sample while the liquid is still spinning.
7. When taking liquid samples, fill the plastic bottle three-fourths full and leave at least 1 inch of air space to allow for gas expansion.
8. When taking dry samples, squeeze all of the excess air from the sealable plastic bag to allow for gas expansion and place the first bag into a second sealable plastic bag to prevent leaks.
9. Label the plastic bags or bottles prior to sampling with your name, date and sample identification number. Use a waterproof pen.
10. After sampling, place the container(s) in the refrigerator or freezer (preferred) until mailed to the lab. Cooling the samples will reduce microbial activity, chemical reactions and reduce odors.
11. Ship samples early in the week (Monday–Wednesday) using an overnight service. Avoid holidays and weekends.

Sampling Semi-Solid and Liquid Manure from Storage Facilities

Manure with 10 to 20 percent solids is classified as semi-solid manure and can usually be handled as a liquid. Semi-solid manure usually requires the use of chopper pumps to provide thorough agitation before pumping. Liquid manure is manure with less than 10 percent solids and is handled with pumps, pipes, tank wagons or irrigation equipment (if less than 5 percent solids).

If all contents of the entire semi-solid or liquid storage facility will be applied, complete agitation (2-4 hours minimum) is required to accurately sample the manure because in liquid and semi-solid systems, settled solids can contain more than 90 percent of the phosphorus. However, if solids will be purposefully left on the bottom when the storage structure is pumped out, as is sometimes the case with lagoons, then complete agitation during sampling will generate artificially high nutrient values. In this case, agitation of the solids or sludge at the bottom of the lagoon is not needed for nutrient analysis, and premixing the surface liquid in the lagoon is not needed.

Methods of Sampling:

Several different methods may be used to sample liquid or semi-solid manure from storage facilities:

1. Use a plastic sampling cup with a 10- to 12-foot handle to obtain surface water samples (see Figure 1). Collect about a pint of sample from several locations (six to eight) around the perimeter of the storage unit about 6 feet from the bank and 12 inches below the surface. Avoid floating debris or scum. Pour each of the samples into a clean plastic bucket and mix well. Pour representative sample in plastic container for shipping. *(Chastain, 2003)*
2. Throw a small plastic bucket tied to a long rope out towards the middle of the storage unit while holding onto the rope. Begin pulling the bucket back to the bank as soon as it strikes the surface. Make sure the bucket is raised above the surface before it strikes the bank. Pour each sample into a larger plastic bucket, and repeat this procedure at four to six locations evenly spaced around the perimeter of the storage unit. Mix all samples well and pour representative sample into a plastic container for shipping. *(Chastain, 2003)*
3. Samples may also be taken using a probe or a tube. They can be constructed out of a 1½-inch diameter PVC pipe. Cut the PVC pipe a foot longer than the depth of the pit. Run a ¼-inch rod or string through the length of the pipe and attach a plug such as a rubber stopper or rubber ball (see Figure 2). The rod or the string must be longer than the pipe. If using a rod, bend the top over to prevent it from falling out of the pipe. The probe should be slowly inserted into the pit or lagoon with the stopper open, to the full depth of the pit. Pull the string or rod to close the bottom of the pipe and pull the probe out of the pit, being careful not to tip the pipe and dump the sample. Release the sample into a large plastic bucket and repeat the process at least three times around the pit. Mix all samples well and pour a representative sample into a plastic container for shipping. *(Rieck-Hinz, 2003)*

Figure 1.

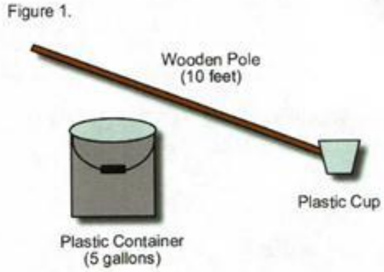
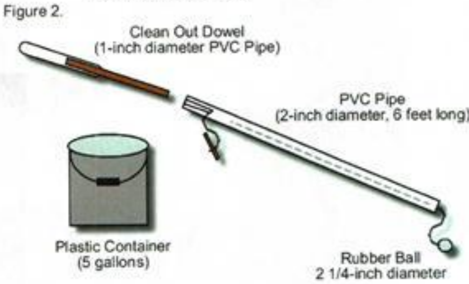


Figure 2.



Sampling Semi-Solid and Liquid Manure during Land Application with Tank Wagons

Settling begins as soon as agitation stops, so samples should be collected as soon as possible after the manure tank wagon is filled, unless the tanker has an agitator. Be sure the port or opening does not have a solids accumulation from prior loads. Collect samples in a plastic bucket from the loading or unloading port or the opening near the bottom of the tank. Stir the sample in the bucket to get the solids in suspension. Remove a ladle full while the liquid is still spinning and pour into the sample bottle. Repeat these steps until the sample bottle is three quarters full.

Sampling Liquid Manure during Land Application with Irrigation Systems

Place plastic buckets randomly at different distances from the sprinkler head in the field to collect the liquid manure that is being applied by an irrigation system. Immediately after manure has been applied, collect manure from the buckets and combine them into one container. Stir the collective sample, remove a ladle full while the liquid is still spinning and pour into the sample bottle.

Pre-Sampling Nitrogen and Potassium from Liquid Manure Systems

If liquid systems cannot be agitated prior to application and a sample is needed to estimate application rates, manure samples can be dipped off the top of the stored liquid manure to analyze for N and K concentrations. Research indicates that the top-dipped liquid represents approximately 90 percent of the N concentration measured in mixed, field-collected samples. Multiply the results of the N concentration from top-dipped samples by 1.1 for a better estimate of N. Dipping a sample from the surface of a liquid storage pit does NOT provide a good estimate of P concentrations in the pit, so use of the P analysis from top-dipped samples is not recommended. Therefore, if application is limited to a P-based application rate, pre-sampling is not recommended. Producers who take these types of samples should remember to take additional samples during application to calculate the actual amount of nutrients applied and use to adjust commercial fertilizer application. *(Rieck-Hinz, 2003)*

Sampling Dry or Solid Manure

Solid manure systems will include fecal matter, urine, bedding and feed. They can vary from one location to another within the same production operation and from season to season. Sampling of dry or solid manure is best done in the field during application, because it will take into account losses that occur during handling and application. Manure is better mixed during application than during storage. Results will not be available in time to adjust application rates; however, sampling will allow producers to adjust any future commercial fertilizer rates and manure application in subsequent years. If a sample must be taken prior to application to estimate application rates, be sure to take samples from various places in the manure pile, stack or litter to obtain a representative sample for analysis. It may even be beneficial to take samples several times during the year because of the variation in bedding content.

Methods of Sampling:

As with liquid or semi-solid systems, many different methods can be used to obtain a representative sample. The method chosen will depend on the type of solid system used on the farm. Sub-samples can be taken with a shovel, pitchfork or soil probe. Regardless of the method of sampling, a composite sample will need to be taken from all of the samples to ensure it represents the entire manure used for application. To obtain a composite sample, place all sub-samples (the more sub-samples, the more accurate the results) in a pile and mix with a shovel by continuously scooping from the outside of the pile to the center of the pile until well mixed. Fill a one-gallon plastic Zip-lock® freezer bag (or the bag provided by the laboratory) one-half full with the composite sample by turning the bag inside out over one hand. With the covered hand, grab representative handfuls of manure and turn the freezer bag right side out over the sample with the free hand. Squeeze out the excess air, close, seal and store sample in another plastic sealable bag in the freezer until mailed. *(Rieck-Hinz, 2003)*

1. *Sampling poultry litter in-house:* Collect 10 to 15 sub-samples from throughout the house to the depth the litter will be removed. Cake litter samples should be taken at the depth of cake removal. The number of samples taken near feeders or waterers should be proportionate to their space occupied in the whole house. *(LPES)*
2. *Sampling stockpiled manure, litter or compost:* Ideally, stockpiled material should be stored under cover on an impervious surface. The exterior of uncovered waste may not accurately represent the majority of the material because rainfall moves water-soluble nutrients down into the pile. If an uncovered stockpile is used over an extended period of time, it should be sampled before each application. Take 10 sub-samples from different locations around the pile at least 18 inches below the surface. *(LPES)*
3. *Sampling from a bedded pack:* It is recommended that samples from a bedded pack be taken during loading. Take at least five sub-samples while loading several spreader loads. *(Peters, 2003)*
4. *Sampling daily hauls:* Place a five-gallon pail under the barn cleaner 4 to 5 times while loading a spreader. *(Peters, 2003)*
5. *Sampling scrape-and-haul feedlots:* Facilities where manure accumulates on paved feedlots and is scraped and hauled to the field daily or several times during the week are referred to as scrape-and-haul feedlots. Sub-samples can be collected by scraping a shovel across approximately 25 feet of the paved feedlot. This process should be repeated 10 or more times, taking care to sample in a direction that slices through the variations of moisture, bedding, depth, age, etc. Avoid excessively wet areas and areas with large amounts of hay or feed. Several composite samples may be needed for this type of facility. *(Rieck-Hinz, 2003)*
6. *Sampling during spreading or land application:* Spread a sheet of plastic or a tarp in the field and drive the tractor and spreader over the top of the plastic to catch the manure from one pass of the spreader. Samples should be collected to represent the first, middle and last part of the storage facility or loads applied and should be correlated as to which loads are applied on each field to track changes in nutrient content throughout the storage facility. *(Rieck-Hinz, 2003)*

References

Peters, John. (ed.) 2003. **Recommended Methods of Manure Analysis**. University of Wisconsin Extension. A3769.

Rieck-Hinz, A., J. Lorimor, T. Richard, and K. Kohl. 2003. **How to Sample Manure for Nutrient Analysis**. Iowa State University Extension. PM1558.

Chastain, J.P. 2003. **Manure Sampling Procedures.** South Carolina Confined Animal Manure Managers Certification Program. Clemson Extension.

Livestock and Poultry Environmental Stewardship (LPES) Curriculum. Manure Sampling. Module D, Land Application and Nutrient Management.

2.4. Predicted Soil Erosion

Average water, wind, irrigation, gully and ephemeral erosion estimates

Field	Predominant Soil Type	T Factor (t/ac/yr)	Slope (%)	Water (Sheet and Rill) (t/ac/yr)	Wind (t/ac/yr)	Irrigation Erosion Controlled (y/n)	Gully Erosion Controlled (y/n)	Ephemeral Erosion Controlled (y/n)
Crutchfield	SeE2 (Smithdale L)	5	18.5	0.8				
Desocio C Bar	LnC3 (Lexington SICL)	4	6.5	2.1				
Desocio Heav	LnC3 (Lexington SICL)	4	6.5	2.1				
Desocio Owen	LnC3 (Lexington SICL)	4	6.5	2.1				
Desocio Home	FeB2 (Feliciana SIL)	5	3.5	1.9				
Desocio Swamp	LeC2 (Lexington SIL)	5	6.5	2.9				
Rancho	LnC3 (Lexington SICL)	4	6.5	2.1				
Hinton	FeA (Feliciana SIL)	5	1.0	0.6				
Parish Jeff	Ao (Arkabutla SIL)	5	1.0	0.7				
Roger Reed	WR (Waverly SIL)	5	0.5	0.6				
Russel Steve	LnC3 (Lexington SICL)	4	6.5	2.1				
Walker Joe	LnC3 (Lexington SICL)	4	6.5	2.1				

Crop period sheet and rill erosion estimates

Field	Crop Year	Primary Crop	Starting Date (mm/dd/yyyy)	Ending Date (mm/dd/yyyy)	Crop Period Soil Loss (t/ac)
Crutchfield	2017	Bermuda hybrid hay	10/2/2016	9/15/2017	0.0
	2018	Bermuda hybrid hay	9/16/2017	9/15/2018	0.3
	2019	Bermuda hybrid hay	9/16/2018	9/15/2019	1.1
	2020	Bermuda hybrid hay	9/16/2019	9/15/2020	0.9
	2021	Bermuda hybrid hay	9/16/2020	10/1/2021	1.9
Desocio C Bar	2017	Soybean	9/16/2016	10/15/2017	1.3
	2018	Corn grain	10/16/2017	9/15/2018	2.0
	2019	Soybean	9/16/2018	10/15/2019	2.0
	2020	Corn grain	10/16/2019	9/15/2020	2.7
	2021	Soybean	9/16/2020	10/15/2021	2.3

Field	Crop Year	Primary Crop	Starting Date (mm/dd/yyyy)	Ending Date (mm/dd/yyyy)	Crop Period Soil Loss (t/ac)
Desocio Heav	2017	Soybean	9/16/2016	10/15/2017	1.3
	2018	Corn grain	10/16/2017	9/15/2018	2.0
	2019	Soybean	9/16/2018	10/15/2019	2.0
	2020	Corn grain	10/16/2019	9/15/2020	2.7
	2021	Soybean	9/16/2020	10/15/2021	2.3
Desocio Owen	2017	Soybean	9/16/2016	10/15/2017	1.3
	2018	Corn grain	10/16/2017	9/15/2018	2.0
	2019	Soybean	9/16/2018	10/15/2019	2.0
	2020	Corn grain	10/16/2019	9/15/2020	2.7
	2021	Soybean	9/16/2020	10/15/2021	2.3
Desocio Home	2017	Corn grain	10/16/2016	9/1/2017	2.0
	2018	Soybean	9/2/2017	10/15/2018	1.7
	2019	Corn grain	10/16/2018	9/15/2019	2.0
	2020	Soybean	9/16/2019	10/15/2020	1.6
	2021	Corn grain	10/16/2020	9/15/2021	2.0
Desocio Swamp	2017	Corn grain	10/16/2016	9/15/2017	3.0
	2018	Soybean	9/16/2017	10/15/2018	2.5
	2019	Corn grain	10/16/2018	9/15/2019	3.1
	2020	Soybean	9/16/2019	10/15/2020	2.5
	2021	Corn grain	10/16/2020	9/15/2021	3.1
Rancho	2017	Soybean	9/16/2016	10/15/2017	1.3
	2018	Corn grain	10/16/2017	9/15/2018	2.0
	2019	Soybean	9/16/2018	10/15/2019	2.0
	2020	Corn grain	10/16/2019	9/15/2020	2.7
	2021	Soybean	9/16/2020	10/15/2021	2.3
Hinton	2017	Soybean	9/16/2016	10/15/2017	0.3
	2018	Corn grain	10/16/2017	9/15/2018	0.6
	2019	Soybean	9/16/2018	10/15/2019	0.6
	2020	Corn grain	10/16/2019	9/15/2020	0.8
	2021	Soybean	9/16/2020	10/15/2021	0.7

Field	Crop Year	Primary Crop	Starting Date (mm/dd/yyyy)	Ending Date (mm/dd/yyyy)	Crop Period Soil Loss (t/ac)
Parish Jeff	2017	Soybean	9/16/2016	10/15/2017	0.5
	2018	Corn grain	10/16/2017	9/15/2018	0.7
	2019	Soybean	9/16/2018	10/15/2019	0.7
	2020	Corn grain	10/16/2019	9/15/2020	0.9
	2021	Soybean	9/16/2020	10/15/2021	0.8
Roger Reed	2017	Corn grain	10/16/2016	9/1/2017	0.6
	2018	Soybean	9/2/2017	10/15/2018	0.5
	2019	Corn grain	10/16/2018	9/15/2019	0.6
	2020	Soybean	9/16/2019	10/15/2020	0.5
	2021	Corn grain	10/16/2020	9/15/2021	0.6
Russel Steve	2017	Soybean	9/16/2016	10/15/2017	1.3
	2018	Corn grain	10/16/2017	9/15/2018	2.1
	2019	Soybean	9/16/2018	10/15/2019	2.1
	2020	Corn grain	10/16/2019	9/15/2020	2.8
	2021	Soybean	9/16/2020	10/15/2021	2.4
Walker Joe	2017	Soybean	9/16/2016	10/15/2017	1.3
	2018	Corn grain	10/16/2017	9/15/2018	2.1
	2019	Soybean	9/16/2018	10/15/2019	2.1
	2020	Corn grain	10/16/2019	9/15/2020	2.8
	2021	Soybean	9/16/2020	10/15/2021	2.4

Section 3. Nutrient Management Plan (590)

3.1. Nitrogen and Phosphorus Risk Analyses

Tennessee Phosphorus Index

Field	Crop Year	Site Total	Management Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Crutchfield	2017	12	22	12	264	Medium
Crutchfield	2018	12	22	12	264	Medium
Crutchfield	2019	12	22	12	264	Medium
Crutchfield	2020	12	22	12	264	Medium
Crutchfield	2021	12	22	12	264	Medium
Desocio C Bar	2017	12	3	12	36	Low
Desocio C Bar	2018	12	10	12	120	Low
Desocio C Bar	2019	12	3	12	36	Low
Desocio C Bar	2020	12	13	12	156	Medium
Desocio C Bar	2021	12	3	12	36	Low
Desocio Heav	2017	12	3	12	36	Low
Desocio Heav	2018	12	5	12	60	Low
Desocio Heav	2019	12	3	12	36	Low
Desocio Heav	2020	12	6	12	72	Low
Desocio Heav	2021	12	3	12	36	Low
Desocio Owen	2017	12	3	12	36	Low
Desocio Owen	2018	12	6	12	72	Low
Desocio Owen	2019	12	3	12	36	Low
Desocio Owen	2020	12	6	12	72	Low
Desocio Owen	2021	12	3	12	36	Low
Desocio Home	2017	11	6	11	66	Low
Desocio Home	2018	12	3	12	36	Low
Desocio Home	2019	11	11	11	121	Low
Desocio Home	2020	12	3	12	36	Low
Desocio Home	2021	11	11	11	121	Low
Desocio Swamp	2017	12	6	12	72	Low

Field	Crop Year	Site Total	Management Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Desocio Swamp	2018	12	3	12	36	Low
Desocio Swamp	2019	12	6	12	72	Low
Desocio Swamp	2020	12	3	12	36	Low
Desocio Swamp	2021	12	6	12	72	Low
Rancho	2017	12	3	12	36	Low
Rancho	2018	12	6	12	72	Low
Rancho	2019	12	3	12	36	Low
Rancho	2020	12	6	12	72	Low
Rancho	2021	12	3	12	36	Low
Hinton	2017	11	3	11	33	Low
Hinton	2018	11	6	11	66	Low
Hinton	2019	11	3	11	33	Low
Hinton	2020	11	6	11	66	Low
Hinton	2021	11	3	11	33	Low
Parish Jeff	2017	11	3	11	33	Low
Parish Jeff	2018	11	6	11	66	Low
Parish Jeff	2019	11	3	11	33	Low
Parish Jeff	2020	11	6	11	66	Low
Parish Jeff	2021	11	3	11	33	Low
Roger Reed	2017	11	5	11	55	Low
Roger Reed	2018	11	3	11	33	Low
Roger Reed	2019	11	6	11	66	Low
Roger Reed	2020	11	3	11	33	Low
Roger Reed	2021	11	6	11	66	Low
Russel Steve	2017	12	3	12	36	Low
Russel Steve	2018	12	6	12	72	Low
Russel Steve	2019	12	3	12	36	Low
Russel Steve	2020	12	6	12	72	Low
Russel Steve	2021	12	3	12	36	Low
Walker Joe	2017	12	3	12	36	Low
Walker Joe	2018	12	6	12	72	Low

Field	Crop Year	Site Total	Management Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Walker Joe	2019	12	3	12	36	Low
Walker Joe	2020	12	6	12	72	Low
Walker Joe	2021	12	3	12	36	Low

3.2. Manure Application Setback Distances

Setback Requirements: Class I CAFO

Feature	Setback Criteria	Setback Distance (Feet)
Streams	Applied upgradient, no permanent or insufficient vegetated setback	100
Streams	New operation, near high quality stream	60
Surface waters	Applied upgradient, no permanent or insufficient vegetated setback	100
Open tile line inlet structures	Applied upgradient, no permanent or insufficient vegetated setback	100
Sinkholes	Applied upgradient, no permanent or insufficient vegetated setback	100
Agricultural well heads	Applied upgradient, no permanent or insufficient vegetated setback	100
Other conduits to surface waters	Applied upgradient, no permanent or insufficient vegetated setback	100
Potable well, public or private	Application down-gradient of feature	150
Potable well, public or private	Application upgradient of feature	300

Source: TN DEQ Rule 1200-4-5-.14(17)(d) (http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf)

Setback Requirements: NRCS Standard

Feature	Setback Criteria	Setback Distance (Feet)
Well	Application upgradient of feature	300
Well	Application down-gradient of feature	150
Waterbody	Predominant slope <5% with good vegetation	30
Waterbody	Poor vegetation	100
Public road	All applications	50
Dwelling (other than producer)	All applications	300
Public use area	All applications	300
Property line	Application upgradient of feature	30

Source: Nutrient Management Standard 590 (http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc)

3.3. Soil Test Data

Field	Test Year	OM (%)	P Test Used	P	K	Mg	Ca	Units	Soil pH	Buffer pH	CEC (meq/ 100g)
Crutchfield	2015		Mehlich-1	9	50			lbs/ac			
Desocio C Bar	2015		Mehlich-1	13	163			lbs/ac			
Desocio Heav	2015		Mehlich-1	11	105			lbs/ac			
Desocio Owen	2016		Mehlich-1	15	231			lbs/ac			
Desocio Home	2015		Mehlich-1	14	82			lbs/ac			
Desocio Swamp	2016		Mehlich-1	17	121			lbs/ac			
Rancho	2016		Mehlich-1	28	118			lbs/ac			
Hinton	2016		Mehlich-1	20	109			lbs/ac			
Parish Jeff	2016		Mehlich-1	10	81			lbs/ac			
Roger Reed	2016		Mehlich-1	29	119			lbs/ac			
Russel Steve	2015		Mehlich-1	8	89			lbs/ac			
Walker Joe	2016		Mehlich-1	42	90			lbs/ac			

3.4. Manure Nutrient Analyses

Manure Source	Dry Matter (%)	Total N	NH_4-N	Total P_2O_5	Total K_2O	Avail. P_2O_5	Avail. K_2O	Units	Analysis Source and Date	Alum Treatment Rate (lbs/1000 sq.ft.)
G1		43.0		6.5	11.8	6.5	11.8	lbs/1000 gal	Herrondale Sow Unit	
G2		43.0		6.5	11.8	6.5	11.8	lbs/1000 gal	Herrondale Sow Unit	
G3		43.0		6.5	11.8	6.5	11.8	lbs/1000 gal	Herrondale Sow Unit	
G4		43.0		6.5	11.8	6.5	11.8	lbs/1000 gal	Herrondale Sow Unit	
F1		17.5		7.0	8.8	7.0	8.8	lbs/1000 gal	Herrondale Sow Unit	
F2		37.1		2.8	11.6	2.8	11.6	lbs/1000 gal	Herrondale Sow Unit	

a. Entered analysis may be the average of several individual analyses.
b. Tennessee assumes that 100% of manure phosphorus and 100% of manure potassium is crop available. First-year per-acre nitrogen availability for individual manure applications is given in the Planned Nutrient Applications table. For more information about nitrogen availability in Tennessee, see "Manure Application Management," Tables 3 and 4, Tennessee Extension, PB1510, 2/94 (http://wastemgmt.ag.utk.edu/Pubs/PB1510.pdf).

3.5. Planned Crops and Fertilizer Recommendations

Field	Crop Year	Planned Crop	Yield Goal (per ac)	N Rec (lbs/ac)	P_2O_5 Rec (lbs/ac)	K_2O Rec (lbs/ac)	N Removed (lbs/ac)	P_2O_5 Removed (lbs/ac)	K_2O Removed (lbs/ac)	Custom Fert. Rec. Source
Crutchfield	2017	Bermuda hybrid hay	8.0 tons	400	120	120	368	96	400	
Crutchfield	2018	Bermuda hybrid hay	8.0 tons	400	120	120	368	96	400	
Crutchfield	2019	Bermuda hybrid hay	8.0 tons	400	120	120	368	96	400	
Crutchfield	2020	Bermuda hybrid hay	8.0 tons	400	120	120	368	96	400	
Crutchfield	2021	Bermuda hybrid hay	8.0 tons	400	120	120	368	96	400	
Desocio C Bar	2017	Small grain[a]	75.0 bu	75	80	20	98	38	26	
Desocio C Bar	2017	Soybean	33.0 bu	0	10	40	132	26	46	
Desocio C Bar	2018	Corn grain	155.0 bu	160	140	70	116	68	45	
Desocio C Bar	2019	Small grain[a]	75.0 bu	90	80	20	98	38	26	
Desocio C Bar	2019	Soybean	33.0 bu	0	10	40	132	26	46	
Desocio C Bar	2020	Corn grain	155.0 bu	160	140	70	116	68	45	
Desocio C Bar	2021	Small grain[a]	75.0 bu	90	80	20	98	38	26	
Desocio C Bar	2021	Soybean	33.0 bu	0	10	40	132	26	46	
Desocio Heav	2017	Small grain[a]	75.0 bu	75	80	40	98	38	26	
Desocio Heav	2017	Soybean	33.0 bu	0	10	80	132	26	46	
Desocio Heav	2018	Corn grain	155.0 bu	160	140	140	116	68	45	
Desocio Heav	2019	Small grain[a]	75.0 bu	90	80	40	98	38	26	
Desocio Heav	2019	Soybean	33.0 bu	0	10	80	132	26	46	
Desocio Heav	2020	Corn grain	155.0 bu	160	140	140	116	68	45	
Desocio Heav	2021	Small grain[a]	75.0 bu	90	80	40	98	38	26	
Desocio Heav	2021	Soybean	33.0 bu	0	10	80	132	26	46	
Desocio Owen	2017	Small grain[a]	75.0 bu	75	80	0	98	38	26	
Desocio Owen	2017	Soybean	33.0 bu	0	10	0	132	26	46	
Desocio Owen	2018	Corn grain	155.0 bu	160	140	0	116	68	45	
Desocio Owen	2019	Small grain[a]	75.0 bu	90	80	0	98	38	26	
Desocio Owen	2019	Soybean	33.0 bu	0	10	0	132	26	46	
Desocio Owen	2020	Corn grain	155.0 bu	160	140	0	116	68	45	
Desocio Owen	2021	Small grain[a]	75.0 bu	90	80	0	98	38	26	
Desocio Owen	2021	Soybean	33.0 bu	0	10	0	132	26	46	

Field	Crop Year	Planned Crop	Yield Goal (per ac)	N Rec (lbs/ac)	P_2O_5 Rec (lbs/ac)	K_2O Rec (lbs/ac)	N Removed (lbs/ac)	P_2O_5 Removed (lbs/ac)	K_2O Removed (lbs/ac)	Custom Fert. Rec. Source
Desocio Home	2017	Corn grain	155.0 bu	160	140	140	116	68	45	
Desocio Home	2018	Small grain[a]	75.0 bu	90	80	40	98	38	26	
Desocio Home	2018	Soybean	33.0 bu	0	10	80	132	26	46	
Desocio Home	2019	Corn grain	155.0 bu	160	140	140	116	68	45	
Desocio Home	2020	Small grain[a]	75.0 bu	90	80	40	98	38	26	
Desocio Home	2020	Soybean	33.0 bu	0	10	80	132	26	46	
Desocio Home	2021	Corn grain	155.0 bu	160	140	140	116	68	45	
Desocio Swamp	2017	Corn grain	155.0 bu	160	140	70	116	68	45	
Desocio Swamp	2018	Small grain[a]	75.0 bu	90	80	20	98	38	26	
Desocio Swamp	2018	Soybean	33.0 bu	0	10	40	132	26	46	
Desocio Swamp	2019	Corn grain	155.0 bu	160	140	70	116	68	45	
Desocio Swamp	2020	Small grain[a]	75.0 bu	90	80	20	98	38	26	
Desocio Swamp	2020	Soybean	33.0 bu	0	10	40	132	26	46	
Desocio Swamp	2021	Corn grain	155.0 bu	160	140	70	116	68	45	
Rancho	2017	Small grain[a]	75.0 bu	75	80	20	98	38	26	
Rancho	2017	Soybean	33.0 bu	0	10	40	132	26	46	
Rancho	2018	Corn grain	155.0 bu	160	140	70	116	68	45	
Rancho	2019	Small grain[a]	75.0 bu	90	80	20	98	38	26	
Rancho	2019	Soybean	33.0 bu	0	10	40	132	26	46	
Rancho	2020	Corn grain	155.0 bu	160	140	70	116	68	45	
Rancho	2021	Small grain[a]	75.0 bu	90	80	20	98	38	26	
Rancho	2021	Soybean	33.0 bu	0	10	40	132	26	46	
Hinton	2017	Small grain[a]	75.0 bu	75	80	40	98	38	26	
Hinton	2017	Soybean	33.0 bu	0	10	80	132	26	46	
Hinton	2018	Corn grain	155.0 bu	160	140	140	116	68	45	
Hinton	2019	Small grain[a]	75.0 bu	90	80	40	98	38	26	
Hinton	2019	Soybean	33.0 bu	0	10	80	132	26	46	
Hinton	2020	Corn grain	155.0 bu	160	140	140	116	68	45	
Hinton	2021	Small grain[a]	75.0 bu	90	80	40	98	38	26	
Hinton	2021	Soybean	155.0 bu	0	10	80	620	124	217	

Field	Crop Year	Planned Crop	Yield Goal (per ac)	N Rec (lbs/ac)	P_2O_5 Rec (lbs/ac)	K_2O Rec (lbs/ac)	N Removed (lbs/ac)	P_2O_5 Removed (lbs/ac)	K_2O Removed (lbs/ac)	Custom Fert. Rec. Source
Parish Jeff	2017	Small grain[a]	75.0 bu	75	80	40	98	38	26	
Parish Jeff	2017	Soybean	33.0 bu	0	10	80	132	26	46	
Parish Jeff	2018	Corn grain	155.0 bu	160	140	140	116	68	45	
Parish Jeff	2019	Small grain[a]	75.0 bu	90	80	40	98	38	26	
Parish Jeff	2019	Soybean	33.0 bu	0	10	80	132	26	46	
Parish Jeff	2020	Corn grain	155.0 bu	160	140	140	116	68	45	
Parish Jeff	2021	Small grain[a]	75.0 bu	90	80	40	98	38	26	
Parish Jeff	2021	Soybean	33.0 bu	0	10	80	132	26	46	
Roger Reed	2017	Corn grain	155.0 bu	160	140	70	116	68	45	
Roger Reed	2018	Small grain[a]	75.0 bu	90	80	20	98	38	26	
Roger Reed	2018	Soybean	33.0 bu	0	10	40	132	26	46	
Roger Reed	2019	Corn grain	155.0 bu	160	140	70	116	68	45	
Roger Reed	2020	Small grain[a]	75.0 bu	90	80	20	98	38	26	
Roger Reed	2020	Soybean	33.0 bu	0	10	40	132	26	46	
Roger Reed	2021	Corn grain	155.0 bu	160	140	70	116	68	45	
Russel Steve	2017	Small grain[a]	75.0 bu	75	80	40	98	38	26	
Russel Steve	2017	Soybean	33.0 bu	0	10	80	132	26	46	
Russel Steve	2018	Corn grain	155.0 bu	160	140	140	116	68	45	
Russel Steve	2019	Small grain[a]	75.0 bu	90	80	40	98	38	26	
Russel Steve	2019	Soybean	33.0 bu	0	10	80	132	26	46	
Russel Steve	2020	Corn grain	155.0 bu	160	140	140	116	68	45	
Russel Steve	2021	Small grain[a]	75.0 bu	90	80	40	98	38	26	
Russel Steve	2021	Soybean	33.0 bu	0	10	80	132	26	46	
Walker Joe	2017	Small grain[a]	75.0 bu	75	40	40	98	38	26	
Walker Joe	2017	Soybean	33.0 bu	0	20	80	132	26	46	
Walker Joe	2018	Corn grain	155.0 bu	160	70	140	116	68	45	
Walker Joe	2019	Small grain[a]	75.0 bu	90	40	40	98	38	26	
Walker Joe	2019	Soybean	33.0 bu	0	20	80	132	26	46	
Walker Joe	2020	Corn grain	155.0 bu	160	70	140	116	68	45	
Walker Joe	2021	Small grain[a]	75.0 bu	90	40	40	98	38	26	

Field	Crop Year	Planned Crop	Yield Goal (per ac)	N Rec (lbs/ac)	P_2O_5 Rec (lbs/ac)	K_2O Rec (lbs/ac)	N Removed (lbs/ac)	P_2O_5 Removed (lbs/ac)	K_2O Removed (lbs/ac)	Custom Fert. Rec. Source
Walker Joe	2021	Soybean	33.0 bu	0	20	80	132	26	46	

a. Unharvested cover crop or first crop in double-crop system.
b. Custom fertilizer recommendation.

3.6. Planned Nutrient Applications (Manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Crutchfield	May 2017	Bermuda hybrid hay	46-0-0	Surface broadcast	1-yr N	767 lbs		128,012 lbs	166.9	353	0	0
Crutchfield	May 2017	Bermuda hybrid hay	0-0-60	Surface broadcast	1-yr K	200 lbs		33,380 lbs	166.9	0	0	120
Crutchfield	May 2017	Bermuda hybrid hay	18-46-0	Surface broadcast	1-yr P	260 lbs		43,394 lbs	166.9	47	120	0
Crutchfield	Apr 2018	Bermuda hybrid hay	G4	Aerway	1-yr P	13,300 gal	1.6 mph	605,570 gal	45.5	400	86	157
Crutchfield	Apr 2018	Bermuda hybrid hay	G3	Aerway	1-yr P	13,300 gal	1.6 mph	526,070 gal	39.6	400	86	157
Crutchfield	May 2018	Bermuda hybrid hay	0-0-60	Surface broadcast	Supp. K	66 lbs		11,015 lbs	166.9	0	0	40
Crutchfield	May 2018	Bermuda hybrid hay	18-46-0	Surface broadcast	Supp. P	165 lbs		27,538 lbs	166.9	30	76	0
Crutchfield	May 2018	Bermuda hybrid hay	46-0-0	Surface broadcast	Supp. N	360 lbs		60,084 lbs	166.9	166	0	0
Crutchfield	May 2019	Bermuda hybrid hay	0-0-60	Surface broadcast	1-yr K	200 lbs		33,380 lbs	166.9	0	0	120
Crutchfield	May 2019	Bermuda hybrid hay	46-0-0	Surface broadcast	1-yr N	723 lbs		120,669 lbs	166.9	333	0	0
Crutchfield	May 2019	Bermuda hybrid hay	18-46-0	Surface broadcast	1-yr P	260 lbs		43,394 lbs	166.9	47	120	0
Crutchfield	Apr 2020	Bermuda hybrid hay	F2	Aerway	2-yr P	15,100 gal	1.4 mph	354,000 gal	23.4	393	42	175
Crutchfield	Apr 2020	Bermuda hybrid hay	G4	Aerway	2-yr P	13,100 gal	1.6 mph	643,200 gal	49.1	394	85	155
Crutchfield	Apr 2020	Bermuda hybrid hay	G3	Aerway	2-yr P	13,100 gal	1.6 mph	161,250 gal	12.3	394	85	155
Crutchfield	May 2020	Bermuda hybrid hay	0-0-60	Surface broadcast	Supp. K	63 lbs		10,515 lbs	166.9	0	0	38
Crutchfield	May 2020	Bermuda hybrid hay	46-0-0	Surface broadcast	Supp. N	347 lbs		57,914 lbs	166.9	160	0	0
Crutchfield	May 2020	Bermuda hybrid hay	18-46-0	Surface broadcast	Supp. P	180 lbs		30,042 lbs	166.9	32	83	0
Crutchfield	May 2021	Bermuda hybrid hay	46-0-0	Surface broadcast	1-yr N	726 lbs		121,169 lbs	166.9	334	0	0
Crutchfield	May 2021	Bermuda hybrid hay	18-46-0	Surface broadcast	1-yr P	260 lbs		43,394 lbs	166.9	47	120	0
Crutchfield	May 2021	Bermuda hybrid hay	0-0-60	Surface broadcast	1-yr K	200 lbs		33,380 lbs	166.9	0	0	120
Desocio C Bar	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal		750 gal	34.1	78	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Desocio C Bar	Apr 2018	Corn grain	F1	Aerway	2-yr P	13,000 gal	1.6 mph	308,400 gal	23.7	160	91	114
Desocio C Bar	Apr 2018	Corn grain	F2	Aerway	2-yr P	6,200 gal	3.4 mph	64,480 gal	10.4	161	17	72
Desocio C Bar	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal		750 gal	34.1	78	0	0
Desocio C Bar	Apr 2020	Corn grain	F1	Aerway	2-yr P	12,600 gal	1.7 mph	308,400 gal	24.5	155	88	111
Desocio C Bar	Apr 2020	Corn grain	F2	Aerway	2-yr P	6,000 gal	3.5 mph	57,600 gal	9.6	156	17	70
Desocio C Bar	Apr 2020	Corn grain	G1	Aerway	2-yr P	5,200 gal	4.1 mph	177,320 gal	34.1	157	34	61
Desocio C Bar	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	18 gal		614 gal	34.1	64	0	0
Desocio Heav	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal		444 gal	20.2	78	0	0
Desocio Heav	Apr 2018	Corn grain	F2	Aerway	2-yr P	6,200 gal	3.4 mph	125,240 gal	20.2	161	17	72
Desocio Heav	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal		444 gal	20.2	78	0	0
Desocio Heav	Apr 2020	Corn grain	G1	Aerway	2-yr P	5,100 gal	4.1 mph	103,020 gal	20.2	154	33	60
Desocio Heav	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal		444 gal	20.2	78	0	0
Desocio Owen	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal		994 gal	45.2	78	0	0
Desocio Owen	Apr 2018	Corn grain	G1	Aerway	2-yr P	5,300 gal	4 mph	138,330 gal	26.1	160	34	63
Desocio Owen	Apr 2018	Corn grain	F2	Aerway	2-yr P	6,200 gal	3.4 mph	118,680 gal	19.1	161	17	72
Desocio Owen	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal		994 gal	45.2	78	0	0
Desocio Owen	Apr 2020	Corn grain	G1	Aerway	2-yr P	5,100 gal	4.1 mph	230,520 gal	45.2	154	33	60
Desocio Owen	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal		994 gal	45.2	78	0	0
Desocio Home	Apr 2017	Corn grain	F2	Aerway	2-yr P	6,200 gal	3.4 mph	179,900 gal	29.0	161	17	72
Desocio Home	Apr 2017	Corn grain	F1	Aerway	2-yr P	13,000 gal	1.6 mph	179,900 gal	13.8	160	91	114
Desocio Home	May 2017	Corn grain	32-0-0	Inject	Supp. N	12 gal		702 gal	58.5	42	0	0
Desocio Home	Feb 2018	Small grain	32-0-0	Surface band	1-yr N	23 gal		1,346 gal	58.5	81	0	0
Desocio Home	Apr 2019	Corn grain	G1	Aerway	2-yr P	5,200 gal	4.1 mph	304,200 gal	58.5	157	34	61
Desocio Home	Apr 2019	Corn grain	F1	Aerway	2-yr P	12,700 gal	1.7 mph	308,400 gal	24.3	156	89	112
Desocio Home	Apr 2019	Corn grain	F2	Aerway	2-yr P	6,000 gal	3.5 mph	205,200 gal	34.2	156	17	70
Desocio Home	Feb 2020	Small grain	32-0-0	Surface band	1-yr N	18 gal		1,053 gal	58.5	64	0	0
Desocio Home	Apr 2021	Corn grain	F1	Aerway	2-yr P	12,100 gal	1.7 mph	308,400 gal	25.5	149	85	106
Desocio Home	Apr 2021	Corn grain	G1	Aerway	2-yr P	5,000 gal	4.2 mph	292,500 gal	58.5	150	33	59
Desocio Home	Apr 2021	Corn grain	F2	Aerway	2-yr P	5,800 gal	3.6 mph	191,400 gal	33.0	151	16	67
Desocio Swamp	Apr 2017	Corn grain	G1	Aerway	2-yr P	5,300 gal	4 mph	180,730 gal	34.1	160	34	63

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Desocio Swamp	Feb 2018	Small grain	32-0-0	Surface band	1-yr N	22 gal		750 gal	34.1	78	0	0
Desocio Swamp	Apr 2019	Corn grain	G1	Aerway	2-yr P	5,100 gal	4.1 mph	173,910 gal	34.1	154	33	60
Desocio Swamp	Feb 2020	Small grain	32-0-0	Surface band	1-yr N	22 gal		750 gal	34.1	78	0	0
Desocio Swamp	Apr 2021	Corn grain	G1	Aerway	2-yr P	5,100 gal	4.1 mph	173,910 gal	34.1	154	33	60
Rancho	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal		2,873 gal	130.6	78	0	0
Rancho	Apr 2018	Corn grain	G1	Aerway	2-yr P	5,300 gal	4 mph	504,870 gal	95.3	160	34	63
Rancho	Apr 2018	Corn grain	G2	Aerway	2-yr P	5,300 gal	4 mph	187,090 gal	35.3	160	34	63
Rancho	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal		2,873 gal	130.6	78	0	0
Rancho	Apr 2020	Corn grain	G1	Aerway	2-yr P	5,100 gal	4.1 mph	132,340 gal	25.9	154	33	60
Rancho	Apr 2020	Corn grain	G2	Aerway	2-yr P	5,100 gal	4.1 mph	533,970 gal	104.7	154	33	60
Rancho	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal		2,873 gal	130.6	78	0	0
Hinton	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal		398 gal	18.1	78	0	0
Hinton	Apr 2018	Corn grain	G2	Aerway	2-yr P	5,300 gal	4 mph	95,930 gal	18.1	160	34	63
Hinton	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal		398 gal	18.1	78	0	0
Hinton	Apr 2020	Corn grain	G2	Aerway	2-yr P	5,100 gal	4.1 mph	92,310 gal	18.1	154	33	60
Hinton	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal		398 gal	18.1	78	0	0
Parish Jeff	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal		1,437 gal	65.3	78	0	0
Parish Jeff	Apr 2018	Corn grain	G2	Aerway	2-yr P	5,300 gal	4 mph	346,090 gal	65.3	160	34	63
Parish Jeff	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal		1,437 gal	65.3	78	0	0
Parish Jeff	Apr 2020	Corn grain	G3	Aerway	3-yr P	5,100 gal	4.1 mph	333,030 gal	65.3	154	33	60
Parish Jeff	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal		1,437 gal	65.3	78	0	0
Roger Reed	Apr 2017	Corn grain	G1	Aerway	2-yr P	5,300 gal	4 mph	194,470 gal	36.7	160	34	63
Roger Reed	Apr 2017	Corn grain	G2	Aerway	2-yr P	5,300 gal	4 mph	375,200 gal	70.8	160	34	63
Roger Reed	Apr 2017	Corn grain	G3	Aerway	2-yr P	5,300 gal	4 mph	375,200 gal	70.8	160	34	63
Roger Reed	Apr 2017	Corn grain	G4	Aerway	2-yr P	5,300 gal	4 mph	375,200 gal	70.8	160	34	63
Roger Reed	May 2017	Corn grain	32-0-0	Inject	Supp. N	19 gal		7,971 gal	419.5	67	0	0
Roger Reed	Feb 2018	Small grain	32-0-0	Surface band	1-yr N	23 gal		9,649 gal	419.5	81	0	0
Roger Reed	Apr 2019	Corn grain	G2	Aerway	2-yr P	5,200 gal	4.1 mph	657,290 gal	126.4	157	34	61
Roger Reed	Apr 2019	Corn grain	G3	Aerway	2-yr P	5,200 gal	4.1 mph	643,200 gal	123.7	157	34	61
Roger Reed	Apr 2019	Corn grain	G1	Aerway	2-yr P	5,200 gal	4.1 mph	165,090 gal	31.7	157	34	61

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Roger Reed	Apr 2019	Corn grain	G4	Aerway	2-yr P	5,200 gal	4.1 mph	643,200 gal	123.7	157	34	61
Roger Reed	May 2019	Corn grain	32-0-0	Inject	Supp. N	1 gal		420 gal	419.5	4	0	0
Roger Reed	Feb 2020	Small grain	32-0-0	Surface band	1-yr N	22 gal		9,229 gal	419.5	78	0	0
Roger Reed	Apr 2021	Corn grain	G3	Aerway	2-yr P	5,100 gal	4.1 mph	643,200 gal	126.1	154	33	60
Roger Reed	Apr 2021	Corn grain	G4	Aerway	2-yr P	5,100 gal	4.1 mph	643,200 gal	126.1	154	33	60
Roger Reed	Apr 2021	Corn grain	G1	Aerway	2-yr P	5,100 gal	4.1 mph	176,790 gal	34.7	154	33	60
Roger Reed	Apr 2021	Corn grain	G2	Aerway	2-yr P	5,100 gal	4.1 mph	660,120 gal	129.4	154	33	60
Roger Reed	May 2021	Corn grain	32-0-0	Inject	Supp. N	1 gal		420 gal	419.5	4	0	0
Russel Steve	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal		486 gal	22.1	78	0	0
Russel Steve	Apr 2018	Corn grain	G3	Aerway	2-yr P	5,300 gal	4 mph	117,130 gal	22.1	160	34	63
Russel Steve	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal		486 gal	22.1	78	0	0
Russel Steve	Apr 2020	Corn grain	G3	Aerway	2-yr P	5,100 gal	4.1 mph	112,710 gal	22.1	154	33	60
Russel Steve	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal		486 gal	22.1	78	0	0
Walker Joe	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal		156 gal	7.1	78	0	0
Walker Joe	Apr 2018	Corn grain	G4	Aerway	2-yr P	5,300 gal	4 mph	37,630 gal	7.1	160	34	63
Walker Joe	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal		156 gal	7.1	78	0	0
Walker Joe	Apr 2020	Corn grain	G3	Aerway	2-yr P	5,100 gal	4.1 mph	36,210 gal	7.1	154	33	60
Walker Joe	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal		156 gal	7.1	78	0	0

Planned Nutrient Applications (Non-manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Crutchfield	May 2017	Bermuda hybrid hay	46-0-0	Surface broadcast	1-yr N	767 lbs	18,101 lbs	23.6	353	0	0
Crutchfield	May 2017	Bermuda hybrid hay	0-0-60	Surface broadcast	1-yr K	200 lbs	4,720 lbs	23.6	0	0	120
Crutchfield	May 2017	Bermuda hybrid hay	18-46-0	Surface broadcast	1-yr P	260 lbs	6,136 lbs	23.6	47	120	0
Crutchfield	May 2018	Bermuda hybrid hay	0-0-60	Surface broadcast	1-yr K	66 lbs	1,558 lbs	23.6	0	0	40
Crutchfield	May 2018	Bermuda hybrid hay	18-46-0	Surface broadcast	1-yr P	165 lbs	3,894 lbs	23.6	30	76	0
Crutchfield	May 2018	Bermuda hybrid hay	46-0-0	Surface broadcast	Supp. N	360 lbs	8,496 lbs	23.6	166	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Crutchfield	May 2019	Bermuda hybrid hay	46-0-0	Surface broadcast	1-yr N	723 lbs	17,063 lbs	23.6	333	0	0
Crutchfield	May 2019	Bermuda hybrid hay	18-46-0	Surface broadcast	1-yr P	260 lbs	6,136 lbs	23.6	47	120	0
Crutchfield	May 2019	Bermuda hybrid hay	0-0-60	Surface broadcast	1-yr K	200 lbs	4,720 lbs	23.6	0	0	120
Crutchfield	May 2020	Bermuda hybrid hay	46-0-0	Surface broadcast	1-yr N	347 lbs	8,189 lbs	23.6	160	0	0
Crutchfield	May 2020	Bermuda hybrid hay	18-46-0	Surface broadcast	1-yr P	180 lbs	4,248 lbs	23.6	32	83	0
Crutchfield	May 2020	Bermuda hybrid hay	0-0-60	Surface broadcast	1-yr K	63 lbs	1,487 lbs	23.6	0	0	38
Crutchfield	May 2021	Bermuda hybrid hay	46-0-0	Surface broadcast	1-yr N	726 lbs	17,134 lbs	23.6	334	0	0
Crutchfield	May 2021	Bermuda hybrid hay	18-46-0	Surface broadcast	1-yr P	260 lbs	6,136 lbs	23.6	47	120	0
Crutchfield	May 2021	Bermuda hybrid hay	0-0-60	Surface broadcast	1-yr K	200 lbs	4,720 lbs	23.6	0	0	120
Desocio C Bar	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal	139 gal	6.3	78	0	0
Desocio C Bar	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal	139 gal	6.3	78	0	0
Desocio C Bar	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	18 gal	113 gal	6.3	64	0	0
Desocio Heav	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal	77 gal	3.5	78	0	0
Desocio Heav	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal	77 gal	3.5	78	0	0
Desocio Heav	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal	77 gal	3.5	78	0	0
Desocio Owen	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal	106 gal	4.8	78	0	0
Desocio Owen	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal	106 gal	4.8	78	0	0
Desocio Owen	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal	106 gal	4.8	78	0	0
Desocio Home	May 2017	Corn grain	32-0-0	Inject	1-yr N	12 gal	59 gal	4.9	42	0	0
Desocio Home	Feb 2018	Small grain	32-0-0	Surface band	1-yr N	23 gal	113 gal	4.9	81	0	0
Desocio Home	Feb 2020	Small grain	32-0-0	Surface band	1-yr N	18 gal	88 gal	4.9	64	0	0
Rancho	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal	117 gal	5.3	78	0	0
Rancho	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal	117 gal	5.3	78	0	0
Rancho	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal	117 gal	5.3	78	0	0
Hinton	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal	24 gal	1.1	78	0	0
Hinton	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal	24 gal	1.1	78	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Hinton	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal	24 gal	1.1	78	0	0
Parish Jeff	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal	64 gal	2.9	78	0	0
Parish Jeff	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal	64 gal	2.9	78	0	0
Parish Jeff	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal	64 gal	2.9	78	0	0
Roger Reed	May 2017	Corn grain	32-0-0	Inject	1-yr N	19 gal	766 gal	40.3	67	0	0
Roger Reed	Feb 2018	Small grain	32-0-0	Surface band	1-yr N	23 gal	927 gal	40.3	81	0	0
Roger Reed	May 2019	Corn grain	32-0-0	Inject	1-yr N	1 gal	40 gal	40.3	4	0	0
Roger Reed	Feb 2020	Small grain	32-0-0	Surface band	1-yr N	22 gal	887 gal	40.3	78	0	0
Roger Reed	May 2021	Corn grain	32-0-0	Inject	1-yr N	1 gal	40 gal	40.3	4	0	0
Russel Steve	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal	174 gal	7.9	78	0	0
Russel Steve	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal	174 gal	7.9	78	0	0
Russel Steve	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal	174 gal	7.9	78	0	0
Walker Joe	Feb 2017	Small grain	32-0-0	Surface band	1-yr N	22 gal	86 gal	3.9	78	0	0
Walker Joe	Feb 2019	Small grain	32-0-0	Surface band	1-yr N	22 gal	86 gal	3.9	78	0	0
Walker Joe	Feb 2021	Small grain	32-0-0	Surface band	1-yr N	22 gal	86 gal	3.9	78	0	0

3.7. Field Nutrient Balance (Manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2017	Crutchfield	166.9	Bermuda hybrid hay	8	400	120	120	400	120	120	0	0	0	24	-280
2018	Crutchfield	166.9	Bermuda hybrid hay	8	400	120	120	400	120	120	0	0	0	48	-280
2019	Crutchfield	166.9	Bermuda hybrid hay	8	400	120	120	380	120	120	0[g]	0	0	72	-280
2020	Crutchfield	166.9	Bermuda hybrid hay	8	400	120	120	392	120	120	0[g]	0	0	96	-280
2021	Crutchfield	166.9	Bermuda hybrid hay	8	400	120	120	381	120	120	0[g]	0	0	120	-280
Total	**Crutchfield**				**2000**	**600**	**600**	**1953**	**600**	**600**					
2017	Desocio C Bar	34.1	Small grain	75	75	80	20								
2017	Desocio C Bar	34.1	Soybean	33	0	10	40	78	0	0	3	-90	-60	-64	-72
2018	Desocio C Bar	34.1	Corn grain	155	160	140	70	160	68	101	0	-72	31	0	56
2019	Desocio C Bar	34.1	Small grain	75	90	80	20								
2019	Desocio C Bar	34.1	Soybean	33	0	10	40	78	0	0	2[g]	-90	-29	-64	-16
2020	Desocio C Bar	34.1	Corn grain	155	160	140	70	312	102	160	157[g]	-38	90	34	115
2021	Desocio C Bar	34.1	Small grain	75	90	80	20								
2021	Desocio C Bar	34.1	Soybean	33	0	10	40	64	0	0	3[g]	-90	30	-30	43
Total	**Desocio C Bar**				**575**	**550**	**320**	**692**	**170**	**261**					
2017	Desocio Heav	20.2	Small grain	75	75	80	40								
2017	Desocio Heav	20.2	Soybean	33	0	10	80	78	0	0	3	-90	-120	-64	-72
2018	Desocio Heav	20.2	Corn grain	155	160	140	140	161	17	72	1	-123	-68	-51	27
2019	Desocio Heav	20.2	Small grain	75	90	80	40								
2019	Desocio Heav	20.2	Soybean	33	0	10	80	78	0	0	2[g]	-90	-120	-64	-45
2020	Desocio Heav	20.2	Corn grain	155	160	140	140	154	33	60	0[g]	-107	-80	-35	15
2021	Desocio Heav	20.2	Small grain	75	90	80	40								
2021	Desocio Heav	20.2	Soybean	33	0	10	80	78	0	0	3[g]	-90	-120	-64	-57
Total	**Desocio Heav**				**575**	**550**	**640**	**549**	**50**	**132**					
2017	Desocio Owen	45.2	Small grain	75	75	80	0								
2017	Desocio Owen	45.2	Soybean	33	0	10	0	78	0	0	3	-90	0	-64	-72
2018	Desocio Owen	45.2	Corn grain	155	160	140	0	160	27	67	0	-113	67	-41	22
2019	Desocio Owen	45.2	Small grain	75	90	80	0								

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2019	Desocio Owen	45.2	Soybean	33	0	10	0	78	0	0	3[g]	-90	67	-64	-50
2020	Desocio Owen	45.2	Corn grain	155	160	140	0	154	33	60	0[g]	-107	127	-35	15
2021	Desocio Owen	45.2	Small grain	75	90	80	0								
2021	Desocio Owen	45.2	Soybean	33	0	10	0	78	0	0	3[g]	-90	127	-64	-57
Total	**Desocio Owen**				**575**	**550**	**0**	**548**	**60**	**127**					
2017	Desocio Home	58.5	Corn grain	155	160	140	140	160	30	63	0	-110	-77	-38	18
2018	Desocio Home	58.5	Small grain	75	90	80	40								
2018	Desocio Home	58.5	Soybean	33	0	10	80	81	0	0	1[g]	-90	-120	-64	-54
2019	Desocio Home	58.5	Corn grain	155	160	140	140	313	81	148	157[g]	-59	8	13	103
2020	Desocio Home	58.5	Small grain	75	90	80	40								
2020	Desocio Home	58.5	Soybean	33	0	10	80	64	0	0	3[g]	-90	-112	-51	31
2021	Desocio Home	58.5	Corn grain	155	160	140	140	300	79	143	151[g]	-61	3	11	129
Total	**Desocio Home**				**660**	**600**	**660**	**918**	**190**	**354**					
2017	Desocio Swamp	34.1	Corn grain	155	160	140	70	160	34	63	0	-106	-7	-34	18
2018	Desocio Swamp	34.1	Small grain	75	90	80	20								
2018	Desocio Swamp	34.1	Soybean	33	0	10	40	78	0	0	3[g]	-90	-60	-64	-54
2019	Desocio Swamp	34.1	Corn grain	155	160	140	70	154	33	60	0[g]	-107	-10	-35	15
2020	Desocio Swamp	34.1	Small grain	75	90	80	20								
2020	Desocio Swamp	34.1	Soybean	33	0	10	40	78	0	0	3[g]	-90	-60	-64	-57
2021	Desocio Swamp	34.1	Corn grain	155	160	140	70	154	33	60	0[g]	-107	-10	-35	15
Total	**Desocio Swamp**				**660**	**600**	**330**	**624**	**100**	**183**					
2017	Rancho	130.6	Small grain	75	75	80	20								
2017	Rancho	130.6	Soybean	33	0	10	40	78	0	0	3	-90	-60	-64	-72
2018	Rancho	130.6	Corn grain	155	160	140	70	160	34	63	0	-106	-7	-34	18
2019	Rancho	130.6	Small grain	75	90	80	20								
2019	Rancho	130.6	Soybean	33	0	10	40	78	0	0	3[g]	-90	-60	-64	-54
2020	Rancho	130.6	Corn grain	155	160	140	70	154	33	60	0[g]	-107	-10	-35	15
2021	Rancho	130.6	Small grain	75	90	80	20								
2021	Rancho	130.6	Soybean	33	0	10	40	78	0	0	3[g]	-90	-60	-64	-57

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
					N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	P_2O_5	K_2O
		ac		per ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac
Total	**Rancho**				**575**	**550**	**320**	**548**	**67**	**123**					
2017	Hinton	18.1	Small grain	75	75	80	40								
2017	Hinton	18.1	Soybean	33	0	10	80	78	0	0	3	-90	-120	-64	-72
2018	Hinton	18.1	Corn grain	155	160	140	140	160	34	63	0	-106	-77	-34	18
2019	Hinton	18.1	Small grain	75	90	80	40								
2019	Hinton	18.1	Soybean	33	0	10	80	78	0	0	3[g]	-90	-120	-64	-54
2020	Hinton	18.1	Corn grain	155	160	140	140	154	33	60	0[g]	-107	-80	-35	15
2021	Hinton	18.1	Small grain	75	90	80	40								
2021	Hinton	18.1	Soybean	155	0	10	80	78	0	0	3[g]	-90	-120	-162	-228
Total	**Hinton**				**575**	**550**	**640**	**548**	**67**	**123**					
2017	Parish Jeff	65.3	Small grain	75	75	80	40								
2017	Parish Jeff	65.3	Soybean	33	0	10	80	78	0	0	3	-90	-120	-64	-72
2018	Parish Jeff	65.3	Corn grain	155	160	140	140	160	34	63	0	-106	-77	-34	18
2019	Parish Jeff	65.3	Small grain	75	90	80	40								
2019	Parish Jeff	65.3	Soybean	33	0	10	80	78	0	0	3[g]	-90	-120	-64	-54
2020	Parish Jeff	65.3	Corn grain	155	160	140	140	154	33	60	0[g]	-107	-80	-35	15
2021	Parish Jeff	65.3	Small grain	75	90	80	40								
2021	Parish Jeff	65.3	Soybean	33	0	10	80	78	0	0	3[g]	-90	-120	-64	-57
Total	**Parish Jeff**				**575**	**550**	**640**	**548**	**67**	**123**					
2017	Roger Reed	419.5	Corn grain	155	160	140	70	162	20	37	2	-120	-33	-48	-8
2018	Roger Reed	419.5	Small grain	75	90	80	20								
2018	Roger Reed	419.5	Soybean	33	0	10	40	81	0	0	0[g]	-90	-60	-64	-72
2019	Roger Reed	419.5	Corn grain	155	160	140	70	156	33	59	0[g]	-107	-11	-35	14
2020	Roger Reed	419.5	Small grain	75	90	80	20								
2020	Roger Reed	419.5	Soybean	33	0	10	40	78	0	0	2[g]	-90	-60	-64	-58
2021	Roger Reed	419.5	Corn grain	155	160	140	70	157	33	60	3[g]	-107	-10	-35	15
Total	**Roger Reed**				**660**	**600**	**330**	**634**	**86**	**156**					
2017	Russel Steve	22.1	Small grain	75	75	80	40								
2017	Russel Steve	22.1	Soybean	33	0	10	80	78	0	0	3	-90	-120	-64	-72

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
					N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	P_2O_5	K_2O
		ac		per ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac
2018	Russel Steve	22.1	Corn grain	155	160	140	140	160	34	63	0	-106	-77	-34	18
2019	Russel Steve	22.1	Small grain	75	90	80	40								
2019	Russel Steve	22.1	Soybean	33	0	10	80	78	0	0	3[g]	-90	-120	-64	-54
2020	Russel Steve	22.1	Corn grain	155	160	140	140	154	33	60	0[g]	-107	-80	-35	15
2021	Russel Steve	22.1	Small grain	75	90	80	40								
2021	Russel Steve	22.1	Soybean	33	0	10	80	78	0	0	3[g]	-90	-120	-64	-57
Total	**Russel Steve**				**575**	**550**	**640**	**548**	**67**	**123**					
2017	Walker Joe	7.1	Small grain	75	75	40	40								
2017	Walker Joe	7.1	Soybean	33	0	20	80	78	0	0	3	-60	-120	-64	-72
2018	Walker Joe	7.1	Corn grain	155	160	70	140	160	34	63	0	-36	-77	-34	18
2019	Walker Joe	7.1	Small grain	75	90	40	40								
2019	Walker Joe	7.1	Soybean	33	0	20	80	78	0	0	3[g]	-60	-120	-64	-54
2020	Walker Joe	7.1	Corn grain	155	160	70	140	154	33	60	0[g]	-37	-80	-35	15
2021	Walker Joe	7.1	Small grain	75	90	40	40								
2021	Walker Joe	7.1	Soybean	33	0	20	80	78	0	0	3[g]	-60	-120	-64	-57
Total	**Walker Joe**				**575**	**320**	**640**	**548**	**67**	**123**					

Field Nutrient Balance (Non-manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
					N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	P_2O_5	K_2O
		ac		per ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac
2017	Crutchfield	23.6	Bermuda hybrid hay	8	400	120	120	400	120	120	0	0	0	24	-280
2018	Crutchfield	23.6	Bermuda hybrid hay	8	400	120	120	196	76	40	-204	-44	-80	4	-360
2019	Crutchfield	23.6	Bermuda hybrid hay	8	400	120	120	380	120	120	-20	0	0	28	-280
2020	Crutchfield	23.6	Bermuda hybrid hay	8	400	120	120	192	83	38	-208	-37	-82	15	-362
2021	Crutchfield	23.6	Bermuda hybrid hay	8	400	120	120	381	120	120	-19	0	0	39	-280
Total	**Crutchfield**				**2000**	**600**	**600**	**1549**	**519**	**438**					
2017	Desocio C Bar	6.3	Small grain	75	75	80	20								
2017	Desocio C Bar	6.3	Soybean	33	0	10	40	78	0	0	3	-90	-60	-64	-72
2018	Desocio C Bar	6.3	Corn grain	155	160	140	70	0	0	0	-160	-140	-70	-68	-45

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2019	Desocio C Bar	6.3	Small grain	75	90	80	20								
2019	Desocio C Bar	6.3	Soybean	33	0	10	40	78	0	0	-12	-90	-60	-64	-72
2020	Desocio C Bar	6.3	Corn grain	155	160	140	70	0	0	0	-160	-140	-70	-68	-45
2021	Desocio C Bar	6.3	Small grain	75	90	80	20								
2021	Desocio C Bar	6.3	Soybean	33	0	10	40	64	0	0	-26	-90	-60	-64	-72
Total	**Desocio C Bar**				**575**	**550**	**320**	**220**	**0**	**0**					
2017	Desocio Heav	3.5	Small grain	75	75	80	40								
2017	Desocio Heav	3.5	Soybean	33	0	10	80	78	0	0	3	-90	-120	-64	-72
2018	Desocio Heav	3.5	Corn grain	155	160	140	140	0	0	0	-160	-140	-140	-68	-45
2019	Desocio Heav	3.5	Small grain	75	90	80	40								
2019	Desocio Heav	3.5	Soybean	33	0	10	80	78	0	0	-12	-90	-120	-64	-72
2020	Desocio Heav	3.5	Corn grain	155	160	140	140	0	0	0	-160	-140	-140	-68	-45
2021	Desocio Heav	3.5	Small grain	75	90	80	40								
2021	Desocio Heav	3.5	Soybean	33	0	10	80	78	0	0	-12	-90	-120	-64	-72
Total	**Desocio Heav**				**575**	**550**	**640**	**234**	**0**	**0**					
2017	Desocio Owen	4.8	Small grain	75	75	80	0								
2017	Desocio Owen	4.8	Soybean	33	0	10	0	78	0	0	3	-90	0	-64	-72
2018	Desocio Owen	4.8	Corn grain	155	160	140	0	0	0	0	-160	-140	0	-68	-45
2019	Desocio Owen	4.8	Small grain	75	90	80	0								
2019	Desocio Owen	4.8	Soybean	33	0	10	0	78	0	0	-12	-90	0	-64	-72
2020	Desocio Owen	4.8	Corn grain	155	160	140	0	0	0	0	-160	-140	0	-68	-45
2021	Desocio Owen	4.8	Small grain	75	90	80	0								
2021	Desocio Owen	4.8	Soybean	33	0	10	0	78	0	0	-12	-90	0	-64	-72
Total	**Desocio Owen**				**575**	**550**	**0**	**234**	**0**	**0**					
2017	Desocio Home	4.9	Corn grain	155	160	140	140	42	0	0	-118	-140	-140	-68	-45
2018	Desocio Home	4.9	Small grain	75	90	80	40								
2018	Desocio Home	4.9	Soybean	33	0	10	80	81	0	0	-9	-90	-120	-64	-72
2019	Desocio Home	4.9	Corn grain	155	160	140	140	0	0	0	-160	-140	-140	-68	-45
2020	Desocio Home	4.9	Small grain	75	90	80	40								
2020	Desocio Home	4.9	Soybean	33	0	10	80	64	0	0	-26	-90	-120	-64	-72

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2021	Desocio Home	4.9	Corn grain	155	160	140	140	0	0	0	-160	-140	-140	-68	-45
Total	**Desocio Home**				**660**	**600**	**660**	**187**	**0**	**0**					
2017	Rancho	5.3	Small grain	75	75	80	20								
2017	Rancho	5.3	Soybean	33	0	10	40	78	0	0	3	-90	-60	-64	-72
2018	Rancho	5.3	Corn grain	155	160	140	70	0	0	0	-160	-140	-70	-68	-45
2019	Rancho	5.3	Small grain	75	90	80	20								
2019	Rancho	5.3	Soybean	33	0	10	40	78	0	0	-12	-90	-60	-64	-72
2020	Rancho	5.3	Corn grain	155	160	140	70	0	0	0	-160	-140	-70	-68	-45
2021	Rancho	5.3	Small grain	75	90	80	20								
2021	Rancho	5.3	Soybean	33	0	10	40	78	0	0	-12	-90	-60	-64	-72
Total	**Rancho**				**575**	**550**	**320**	**234**	**0**	**0**					
2017	Hinton	1.1	Small grain	75	75	80	40								
2017	Hinton	1.1	Soybean	33	0	10	80	78	0	0	3	-90	-120	-64	-72
2018	Hinton	1.1	Corn grain	155	160	140	140	0	0	0	-160	-140	-140	-68	-45
2019	Hinton	1.1	Small grain	75	90	80	40								
2019	Hinton	1.1	Soybean	33	0	10	80	78	0	0	-12	-90	-120	-64	-72
2020	Hinton	1.1	Corn grain	155	160	140	140	0	0	0	-160	-140	-140	-68	-45
2021	Hinton	1.1	Small grain	75	90	80	40								
2021	Hinton	1.1	Soybean	155	0	10	80	78	0	0	-12	-90	-120	-162	-243
Total	**Hinton**				**575**	**550**	**640**	**234**	**0**	**0**					
2017	Parish Jeff	2.9	Small grain	75	75	80	40								
2017	Parish Jeff	2.9	Soybean	33	0	10	80	78	0	0	3	-90	-120	-64	-72
2018	Parish Jeff	2.9	Corn grain	155	160	140	140	0	0	0	-160	-140	-140	-68	-45
2019	Parish Jeff	2.9	Small grain	75	90	80	40								
2019	Parish Jeff	2.9	Soybean	33	0	10	80	78	0	0	-12	-90	-120	-64	-72
2020	Parish Jeff	2.9	Corn grain	155	160	140	140	0	0	0	-160	-140	-140	-68	-45
2021	Parish Jeff	2.9	Small grain	75	90	80	40								
2021	Parish Jeff	2.9	Soybean	33	0	10	80	78	0	0	-12	-90	-120	-64	-72
Total	**Parish Jeff**				**575**	**550**	**640**	**234**	**0**	**0**					

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2017	Roger Reed	40.3	Corn grain	155	160	140	70	67	0	0	-93	-140	-70	-68	-45
2018	Roger Reed	40.3	Small grain	75	90	80	20								
2018	Roger Reed	40.3	Soybean	33	0	10	40	81	0	0	-9	-90	-60	-64	-72
2019	Roger Reed	40.3	Corn grain	155	160	140	70	4	0	0	-156	-140	-70	-68	-45
2020	Roger Reed	40.3	Small grain	75	90	80	20								
2020	Roger Reed	40.3	Soybean	33	0	10	40	78	0	0	-12	-90	-60	-64	-72
2021	Roger Reed	40.3	Corn grain	155	160	140	70	4	0	0	-156	-140	-70	-68	-45
Total	**Roger Reed**				**660**	**600**	**330**	**234**	**0**	**0**					
2017	Russel Steve	7.9	Small grain	75	75	80	40								
2017	Russel Steve	7.9	Soybean	33	0	10	80	78	0	0	3	-90	-120	-64	-72
2018	Russel Steve	7.9	Corn grain	155	160	140	140	0	0	0	-160	-140	-140	-68	-45
2019	Russel Steve	7.9	Small grain	75	90	80	40								
2019	Russel Steve	7.9	Soybean	33	0	10	80	78	0	0	-12	-90	-120	-64	-72
2020	Russel Steve	7.9	Corn grain	155	160	140	140	0	0	0	-160	-140	-140	-68	-45
2021	Russel Steve	7.9	Small grain	75	90	80	40								
2021	Russel Steve	7.9	Soybean	33	0	10	80	78	0	0	-12	-90	-120	-64	-72
Total	**Russel Steve**				**575**	**550**	**640**	**234**	**0**	**0**					
2017	Walker Joe	3.9	Small grain	75	75	40	40								
2017	Walker Joe	3.9	Soybean	33	0	20	80	78	0	0	3	-60	-120	-64	-72
2018	Walker Joe	3.9	Corn grain	155	160	70	140	0	0	0	-160	-70	-140	-68	-45
2019	Walker Joe	3.9	Small grain	75	90	40	40								
2019	Walker Joe	3.9	Soybean	33	0	20	80	78	0	0	-12	-60	-120	-64	-72
2020	Walker Joe	3.9	Corn grain	155	160	70	140	0	0	0	-160	-70	-140	-68	-45
2021	Walker Joe	3.9	Small grain	75	90	40	40								
2021	Walker Joe	3.9	Soybean	33	0	20	80	78	0	0	-12	-60	-120	-64	-72
Total	**Walker Joe**				**575**	**320**	**640**	**234**	**0**	**0**					

[a] Fertilizer Recs are the crop fertilizer recommendations. The N rec accounts for any N credit from previous legume crop.

[b] Nutrients Applied are the nutrients expected to be available to the crop from that year's manure applications plus nutrients from that year's commercial fertilizer applications and nitrates from irrigation water. With a double-crop year, the total nutrients applied for both crops and the year's balances are listed on the second crop's line.

[c] For N, Nutrients Applied minus Fertilizer Recs for indicated crop year. Also includes amount of residual N expected to become available that year from prior years' manure applications. For P_2O_5 and K_2O, Nutrients Applied minus Fertilizer Recs *through* the indicated crop year, with positive balances carried forward to subsequent years. Negative

values indicate a potential need to apply additional nutrients.

[d] Nutrients Applied minus amount removed by harvested portion of crop through the indicated year. Positive balances are carried forward to subsequent years.

[e] Custom fertilizer recommendation.

[f] Legume crop is assumed to utilize some or all of the supplied N.

[g] Includes residual N expected to become available that year from prior years' manure applications.

3.8. Manure Inventory Annual Summary (Optional)

Manure Source	Plan Period	On Hand at Start of Period	Total Generated	Total Imported	Total Trans-ferred In	Total Applied	Total Exported	Total Trans-ferred Out	On Hand at End of Period	Units
G1	Oct '16 - Sep '17	0	642,857	0	0	375,200	0	0	267,657	gal
G2	Oct '16 - Sep '17	0	642,857	0	0	375,200	0	0	267,657	gal
G3	Oct '16 - Sep '17	0	642,857	0	0	375,200	0	0	267,657	gal
G4	Oct '16 - Sep '17	0	642,857	0	0	375,200	0	0	267,657	gal
F1	Oct '16 - Sep '17	0	308,520	0	0	179,900	0	0	128,620	gal
F2	Oct '16 - Sep '17	0	308,520	0	0	179,900	0	0	128,620	gal
All Sources	**Oct '16 - Sep '17**	**0**	**3,188,468**	**0**	**0**	**1,860,600**	**0**	**0**	**1,327,868**	**gal**
G1	Oct '17 - Sep '18	267,657	642,857	0	0	643,200	0	0	267,314	gal
G2	Oct '17 - Sep '18	267,657	642,857	0	0	629,110	0	0	281,404	gal
G3	Oct '17 - Sep '18	267,657	642,857	0	0	643,200	0	0	267,314	gal
G4	Oct '17 - Sep '18	267,657	642,857	0	0	643,200	0	0	267,314	gal
F1	Oct '17 - Sep '18	128,620	308,520	0	0	308,400	0	0	128,740	gal
F2	Oct '17 - Sep '18	128,620	308,520	0	0	308,400	0	0	128,740	gal
All Sources	**Oct '17 - Sep '18**	**1,327,868**	**3,188,468**	**0**	**0**	**3,175,510**	**0**	**0**	**1,340,826**	**gal**
G1	Oct '18 - Sep '19	267,314	642,857	0	0	643,200	0	0	266,971	gal
G2	Oct '18 - Sep '19	281,404	642,857	0	0	657,290	0	0	266,971	gal
G3	Oct '18 - Sep '19	267,314	642,857	0	0	643,200	0	0	266,971	gal
G4	Oct '18 - Sep '19	267,314	642,857	0	0	643,200	0	0	266,971	gal
F1	Oct '18 - Sep '19	128,740	308,520	0	0	308,400	0	0	128,860	gal
F2	Oct '18 - Sep '19	128,740	308,520	0	0	205,200	0	0	232,060	gal
All Sources	**Oct '18 - Sep '19**	**1,340,826**	**3,188,468**	**0**	**0**	**3,100,490**	**0**	**0**	**1,428,804**	**gal**
G1	Oct '19 - Sep '20	266,971	642,857	0	0	643,200	0	0	266,628	gal
G2	Oct '19 - Sep '20	266,971	642,857	0	0	626,280	0	0	283,548	gal
G3	Oct '19 - Sep '20	266,971	642,857	0	0	643,200	0	0	266,628	gal
G4	Oct '19 - Sep '20	266,971	642,857	0	0	643,200	0	0	266,628	gal
F1	Oct '19 - Sep '20	128,860	308,520	0	0	308,400	0	0	128,980	gal
F2	Oct '19 - Sep '20	232,060	308,520	0	0	411,600	0	0	128,980	gal
All Sources	**Oct '19 - Sep '20**	**1,428,804**	**3,188,468**	**0**	**0**	**3,275,880**	**0**	**0**	**1,341,392**	**gal**
G1	Oct '20 - Sep '21	266,628	642,857	0	0	643,200	0	0	266,285	gal
G2	Oct '20 - Sep '21	283,548	642,857	0	0	660,120	0	0	266,285	gal
G3	Oct '20 - Sep '21	266,628	642,857	0	0	643,200	0	0	266,285	gal
G4	Oct '20 - Sep '21	266,628	642,857	0	0	643,200	0	0	266,285	gal
F1	Oct '20 - Sep '21	128,980	308,520	0	0	308,400	0	0	129,100	gal
F2	Oct '20 - Sep '21	128,980	308,520	0	0	191,400	0	0	246,100	gal
All Sources	**Oct '20 - Sep '21**	**1,341,392**	**3,188,468**	**0**	**0**	**3,089,520**	**0**	**0**	**1,440,340**	**gal**

3.9. Fertilizer Material Annual Summary (Optional)

Product Analysis	Plan Period	Product Needed Oct - Dec	Product Needed Jan - Sep	Total Product Needed	Units
32-0-0	Oct '16 - Sep '17	0	17,821	17,821	gal
18-46-0	Oct '16 - Sep '17	0	49,530	49,530	lbs
46-0-0	Oct '16 - Sep '17	0	146,114	146,114	lbs
0-0-60	Oct '16 - Sep '17	0	38,100	38,100	lbs
32-0-0	Oct '17 - Sep '18	0	12,783	12,783	gal
18-46-0	Oct '17 - Sep '18	0	31,432	31,432	lbs
46-0-0	Oct '17 - Sep '18	0	68,580	68,580	lbs
0-0-60	Oct '17 - Sep '18	0	12,573	12,573	lbs
32-0-0	Oct '18 - Sep '19	0	8,784	8,784	gal
18-46-0	Oct '18 - Sep '19	0	49,530	49,530	lbs
46-0-0	Oct '18 - Sep '19	0	137,732	137,732	lbs
0-0-60	Oct '18 - Sep '19	0	38,100	38,100	lbs
32-0-0	Oct '19 - Sep '20	0	12,007	12,007	gal
18-46-0	Oct '19 - Sep '20	0	34,290	34,290	lbs
46-0-0	Oct '19 - Sep '20	0	66,104	66,104	lbs
0-0-60	Oct '19 - Sep '20	0	12,002	12,002	lbs
32-0-0	Oct '20 - Sep '21	0	8,622	8,622	gal
18-46-0	Oct '20 - Sep '21	0	49,530	49,530	lbs
46-0-0	Oct '20 - Sep '21	0	138,303	138,303	lbs
0-0-60	Oct '20 - Sep '21	0	38,100	38,100	lbs

3.10. Plan Nutrient Balance (Manure-spreadable Area)

	N (lbs)	P_2O_5 (lbs)	K_2O (lbs)
Total Manure Nutrients on Hand at Start of Plan[a]	0	0	0
Total Manure Nutrients Collected[b]	637,083	98,689	183,183
Total Manure Nutrients Imported[c]	0	0	0
Total Manure Nutrients Exported[d]	0	0	0
Total Manure Nutrients Gained/Lost in Transfer[e]	0	0	0
Total Manure Nutrients on Hand at End of Plan[f]	57,191	8,516	16,559
Total Manure Nutrients Applied[g]	579,889	89,853	166,564
Available Manure Nutrients Applied (Utilized by plan's crops)[h]	445,642	89,853	166,564
Available Manure Nutrients Applied (Not utilized by plan's crops)[i]	15,096	0	0
Commercial Fertilizer Nutrients Applied (Utilized by plan's crops)[j]	452,665	86,621	73,102
Commercial Fertilizer Nutrients Applied (Not utilized by plan's crops)[k]	0	0	0
Available Nutrients Applied (Manure and fertilizer; utilized by plan's crops)[l]	898,307	176,474	239,666
Nutrient Utilization Potential[m]	1,148,575	628,650	692,920
Nutrient Balance of Spreadable Acres[n p]	-250,268	-452,176	-453,254
Average Nutrient Balance per Spreadable Acre per Year[o p]	-49	-89	-89

a. Total manure nutrients present in storage at the beginning of the plan.
b. Total manure nutrients collected on the farm.
c. Total manure nutrients imported onto the farm.
d. Total manure nutrients exported from the farm to an external operation.
e. Net change in total manure nutrients due to transfers between storage units with differing analyses.
f. Total manure nutrients present in storage at the end of plan.
g. Total nutrients present in land-applied manure. These values do not account for losses due to rate, timing, and method of application.
h. Manure nutrients applied and available to crops in the plan. These values are based on the total manure nutrients applied after accounting for nutrient losses due to rate, timing, and method of application. Nutrients which will not be utilized by crops in the plan are excluded from these values.
i. Manure nutrients applied that will be utilized by crops outside the plan. This usually results from Fall nutrient applications at the end of the plan intended for crops in subsequent years.
j. Nutrients applied as commercial fertilizers and nitrates contained in irrigation water. Nutrients that will not be utilized by crops in the plan are excluded from these values.
k. Nutrients applied as commercial fertilizer which will be utilized by crops outside the plan.
l. Sum of available manure nutrients applied and commercial fertilizer nutrients applied.
m. Nutrient utilization potential of crops grown. For N the value is based on the N recommendation for non-legume crops and N uptake or other state-imposed limit for N application rates for legumes. P_2O_5 and K_2O values are based on fertilizer recommendations or crop removal (whichever is greater).
n. Available nutrients applied minus crop nutrient utilization potential. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
o. Average per acre-year nutrient balance. Values are calculated by dividing nutrient balance of spreadable acres by the number of spreadable acres in the plan and by the length of the plan in years. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.

p. Non-trivial, positive values for N indicate that the plan was not properly developed. Negative values for N indicate additional nutrient utilization potential which may or may not be intentional. For example, plans that include legume crops often will not utilize the full N utilization potential for legume crops if manure can be applied to non-legume crops that require N for optimum yield. Positive values for P_2O_5 and/or K_2O do not necessarily indicate that the plan was developed improperly. For example, producers may be allowed to apply N-based application rates of manure to fields with low soil test P values or fields with a low potential P-loss risk based on the risk assessment tool used by the state. Negative values for P_2O_5 and K_2O indicate that planned applications to some fields are less than crop removal rates or fertilizer recommendations.

Plan Nutrient Balance (Non-manure-spreadable Area)

	N (lbs)	P_2O_5 (lbs)	K_2O (lbs)
Commercial Fertilizer Nutrients Applied[a]	55,169	12,248	10,337
Nutrient Utilization Potential[b]	97,560	60,018	46,757
Nutrient Balance of Non-spreadable Acres[c e]	-42,391	-47,770	-36,420
Average Nutrient Balance per Non-spreadable Acre per Year[d e]	-81	-91	-70

a. Nutrients applied as commercial fertilizers and nitrates contained in irrigation water.
b. Nutrient utilization potential of crops grown based on crop fertilizer recommendations.
c. Commercial fertilizer nutrients applied minus crop nutrient utilization potential. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
d. Average per acre-year nutrient balance. Values are calculated by dividing nutrient balance of non-spreadable acres by number of non-spreadable acres in plan and by the length of the plan in years. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.

e. Non-trivial, positive values for N indicate that the plan was not properly developed. Negative values for N indicate additional nutrient utilization potential which may or may not be intentional. Positive values for P_2O_5 and/or K_2O do not necessarily indicate that the plan was developed improperly. For example, multiple year applications may have been planned during the final plan year(s) and these nutrients will not be utilized by crops in the current plan. Negative values for P_2O_5 and K_2O indicate that applications to some fields may have been delayed to allow the producer to apply the nutrients in accordance with their fertilization schedule.

Closure Plan

In the event that Swine production at this location ceases, the following will be done within 360 days:

- All manure in all animal use areas will be removed and spread on the farm or spread elsewhere according to my current Nutrient Management Plan.

- The most current manure analysis will be provided to anyone removing manure from the farm.

- Any dead pigs on the farm will be disposed of at the time of closure according to methods outlined in my current Nutrient Management Plan and or allowable by Tennessee Law.

- Any manure which is land applied will be done so according to the rates discussed in my most recent Nutrient Management Plan.

The following will be completed within a reasonable period as allowable by law using Tennessee Natural Resources Conservation Service (NRCS) Standard Code 360- Closure of Waste Impoundments:

- Any manure storage facility (pits) located on the swine farm will be properly decommissioned.

- Any manure currently in storage at the time of closure will be removed and spread on the farm or spread elsewhere according to my current Nutrient Management Plan.

- The lagoon will be breached and backfilled and or converted to freshwater storage according to NRCS standards.

____

Date: __________________________

Declarations to Nutrient Management Plan:

By my signature below, I affirm that I have read, understand, and will comply with the following stipulations from Tennessee's CAFO regulations that apply to my CAFO operation:

1) All animals in confinement are prevented from coming in direct contact with waters of the state.
2) All chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals and other contaminants.
3) Pesticide-contaminated waters will be prevented from discharging into waste retention structures. Waste from pest control and from facilities used to manage potentially hazardous or toxic chemicals shall be handled and disposed of in a manner that will prevent pollutants from entering waste retention structures or waters of the state.
4) Chemicals, manure/litter, and process wastewater will be managed to prevent spills. Spill clean-up plans will be developed and any equipment needed for spill clean-up will be available to facility personnel.
5) All sampling of soil and manure/litter is conducted according to protocols developed by UT Extension.
6) All records outlined in the permit that I am applying for will be maintained and available on-site.
7) Any confinement buildings, waste/wastewater handling or treatment systems, lagoons, holding ponds, and any other agricultural waste containment/treatment structures constructed or modified after April 13, 2006, are or will be located in accordance with NRCS Conservation Practice Standard 313.
8) A copy of the most recent Nutrient Management Plan will be kept as part of the farm records and will be maintained and implemented as written.
9) If applicable, all waste directed to under floor pits shall be composed entirely of wastewater (i.e. washwater and animal waste).
10) The Tennessee Department of Environment and Conservation Division of Water Resources will be notified of any significant wildlife mortalities near retention ponds or following any land application of animal wastes to fields.
11) All employees involved in work activities that relate to permit compliance will receive regular training on proper operation and maintenance (O&M) of the facility and waste disposal. Training shall include appropriate topics, such as land application of wastes, good housekeeping and material management practices, proper O&M of the facility, record keeping, and spill response and clean up. The periodic scheduled dates for such training shall be identified in the current Nutrient Management Plan.
12) There shall be no land application of nutrients within 24 hours of a precipitation event that may cause runoff. The operator shall not land apply nutrients to frozen, flooded, or saturated soils.

___________________________________ ________________

Signature of CAFO Owner/Operator Date

Record Keeping

This section includes a list of key records that Tosh Farms will keep in order to document and verify implementation of the procedures in this CNMP. Records shall be kept for a minimum of 5 years, or for the length of the contract, rotation, or permit, whichever is longer, for each field where manure is applied.

These general records include but are not limited to:

1. Soil Test Results
2. Weather and soil conditions 24 hours prior to, during and 24 hours application of manure, chemicals and pesticides.
3. Type, quantities, and sources of all nutrients generated and collected
4. Type, quantities, and sources of all nutrients applied to each field
5. Dates of manure applications
6. Inspection Reports
7. Operation and Maintenance records of conservation practices and equipment
8. Restricted pesticides used to meet label requirements
9. Equipment Calibration records
10. Crops planted, tillage method and dates planted
11. Crop harvest dates and yield
12. Adjustments to nutrient management plan based on records and changes in farming operations as appropriate
13. Weekly check of volume in pit
14. Annual visual inspection of retention structure (pits), animal holding areas, if applicable and land application areas
15. Records of mortalities and how managed

Operation and Maintenance

Jimmy Tosh is responsible for safe operation and maintenance of the nutrient management plan including all equipment. Operation and maintenance includes the following items:

1. periodic plan review to determine if adjustments or modifications to the plan are needed. As minimum, plans will be reviewed/revised with each soil test cycle.
2. weekly there will be a visual inspection of pits
3. calibration of application equipment to ensure uniform distribution of material at planned rates.
4. documentation of the actual rate at which nutrients were applied. When the actual rates used differ from or exceed the recommended and planned rates, records will indicate the reasons for the differences.
5. Maintaining records to document plan implementation. As applicable, records include
    a. Soil test results and recommendations for nutrient application
    b. Quantities, analysis and sources of nutrients applied
    c. Dates and method of nutrient applications
    d. Crops planted, planting and harvest dates, yields, and residues removed
    e. Results of water, plant and organic byproduct analysis
    f. Dates of review and person performing the review and recommendations
    g. Conservation practices being applied.

Records will be maintained for five years or for a period longer than five years if required by other Federal, state, or local ordinances or program or contract requirements.

The disposal of material generated by the cleaning nutrient application equipment accomplished properly. Excess material should be collected and stored or field applied in an appropriate manner. Excess material should not be applied on areas of high potential risk for runoff and leaching.

The disposal/recycling of nutrient containers should be according to state and local guidelines or regulations.

Pesticides, toxic chemicals, and petroleum products will not be used in areas where leakage could enter the manure storage facility.

Conservation Practices Operation & Maintenance

Heavy Use Area Protection

The Operation and Maintenance (O&M) plan shall specify that the treatment areas and associated practices will be inspected annually and after significant storm events to identify repair and maintenance needs. The O&M plan shall contain the operational requirements for managing the heavy use area. Planned scraping intervals, replacement of fine material, storage, treatment, and/or utilization methods will also be described. Provisions for re-establishment of vegetated areas will be included. The O&M plan shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice. If using a front-end loader, recommend back dragging the manure/hay to conserve removal of gravel from the surface. Consider using fabricated large equipment tire for scraping surface. The O&M plan shall be provided to, and discussed with, the operator. The O&M plan must complement the Comprehensive Nutrient Management Plan, as necessary.

Composting Facility

An operation and maintenance (O&M) plan shall be developed consistent with the purposes of this standard, its intended life, safety requirements, and the criteria for its design. The O&M plan shall include recipe ingredients and sequence that they are layered and mixed, maximum and minimum temperature for operation, land application rates, moisture level, management of odors, testing, etc. Make adjustments throughout the composting period to ensure proper composting processes. The compost facility should be inspected regularly when the facility is empty. Replace deteriorated wooden materials or hardware. Patch concrete floors and curbs as necessary to assure water tightness. Roof structures should be examined for structural integrity and repaired as needed. Exposed metal components should be inspected for corrosion. Corroded metal should be wire brushed and painted as necessary. Closely monitor temperatures above 165^{o}F. Take action immediately to cool piles that have reached temperatures above 185^{o}F. The operation and maintenance plan shall state that composting is a biological process. It requires a combination of art and science for success. Hence, the operation may need to undergo some trial and error in the start-up of a new composting facility.

Nutrient Management (590)

The owner/client is responsible for safe operation and maintenance of the nutrient management plan including all equipment. Operation and maintenance addresses the following:

1. periodic plan review to determine if adjustments or modifications to the plan are needed. As a minimum, plans will be reviewed/revised with each soil test cycle.
2. protection of fertilizer and organic byproduct storage facilities from weather and accidental leakage or spillage.
3. calibration of application equipment to ensure uniform distribution of material at planned rates.
4. documentation of the actual rate at which nutrients were applied. When the actual rates used differ from or exceed the recommended and planned rates, records will indicate the reasons for the differences.
5. Maintaining records to document plan implementation. As applicable, records include:

soil test results and recommendations for nutrient application,

quantities, analyses and sources of nutrients applied,

dates and method of nutrient applications,

crops planted, planting and harvest dates, yields, and residues removed,

results of water, plant, and organic byproduct analyses, and

dates of review and person performing the review, and recommendations.

Records should be maintained for five years or for a period longer than five years if required by other Federal, state, or local ordinances, or program or contract requirements. Workers shall be protected from and avoid unnecessary contact with chemical fertilizers and organic by-products. Protection should include the use of protective clothing when working with plant nutrients. Extra caution must be taken when handling ammonia sources of nutrients, or when dealing with organic wastes stored in unventilated enclosures. The disposal of material generated by the cleaning nutrient application equipment should be accomplished properly. Excess material should be collected and stored or field applied in an appropriate manner. Excess material should not be applied on areas of high potential risk for runoff and leaching. The disposal/recycling of nutrient containers should be according to state and local guidelines or regulations.

Waters Agricultural Laboratories, Inc.

Liquid Manure/Sludge

Analysis and Application Report

P.O. Box 382 257 Newton Highway Camilla, Georgia 31730-0382 Phone: (229) 336-7216

Ship To:
TOSH FARMS
P.O. BOX 308
HENRY, TN 38231-

Grower: HERRONDALE

SampleNumber: 1
Lab Number: 62039MS

Date Submitted: 05/09/2016
Report Date: 05/11/2016

Type: Manure Liquid Slurry-Other
Application Method: Broadcast

Test	ppm	lbs. per 1000 gal.	Estimate of Nutrients Available For First Crop- lbs/1000 gal.
Nitrogen - Total	5160.7	43.04	17.22
P2O5 - Total	781.13	6.51	6.51
K2O - Total	1413.1	11.79	11.79

Results Reported On: L=LIQUID BASIS

Remarks:

Manure tests from sow unit with same feeders pigs source and feed supply. Manure tests and production based upon Herrondale sow unit but expanded to match this facilities pigs numbers. Once farm is in place the plan will be updated.

Waters Agricultural Laboratories, Inc.

Liquid Manure/Sludge

Analysis and Application Report

P.O. Box 382 257 Newton Highway Camilla, Georgia 31730-0382 Phone: (229) 336-7216

Ship To:
TOSH FARMS
P.O. BOX 308
HENRY, TN 38231-

Grower: HERRONDALE

SampleNumber: 2
Lab Number: 62040MS

Date Submitted: 05/09/2016
Report Date: 05/11/2016

Type: Manure Liquid Slurry-Other
Application Method: Broadcast

Test	ppm	lbs. per 1000 gal.	Estimate of Nutrients Available For First Crop- lbs/1000 gal.
Nitrogen - Total	4450.5	37.12	14.85
P2O5 - Total	340.73	2.84	2.84
K2O - Total	1389.23	11.59	11.59

Results Reported On: L=LIQUID BASIS

Remarks:

Waters Agricultural Laboratories, Inc.

Manure/Sludge Analysis and Application Report

*P.O. Box 382 * 257 Newton Highway * Camilla, Georgia 31730-0382 * phone: (229) 336-7216*

Ship To: **TOSH FARMS** P.O. BOX 308 HENRY, TN 38231-	Grower: **HERONDALE**	
	SampleNumber: **1** Lab Number: **61914MS** Type: **LAGOON**	Date Submitted: **04/07/2016** Report Date: **04/12/2016**

	Parts per million (ppm)	Pounds per 1000 gallons
Nitrogen - Total	2100	17.514
P2O5 - Total	839.8	7.004
K2O - Total	1061.4	8.852

Results Reported On: L=LIQUID BASIS

Remarks Suggest the use of PLANT and SOIL analysis to monitor the need for additional and/or build up of some elements.

SOIL TEST REPORT

TOSH FARMS

1586 ATLANTIC AVENUE
HENRY, TN 382310000

Deborah K. Joines
Deborah K. Joines
Manager
Soil, Plant and Pest Center
5201 Marchant Drive
Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

Date Tested: 5/26/2015

County: Henry

Lab Number: 506422

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID F5311

(Pounds Per Acre)

Water pH	Buffer Value	P Phosphorus		K Potassium		Ca Calcium		Mg Magnesium		Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
5.5	7.5	9	*L*	50	*L*	1347	*S*	209	*S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

F5311

Fertilizer/Lime Application Rate and Timing

Corn (150-175 BU/A)

$N / P_2O_5 / K_2O$

Nitrogen/Phosphate/Potash: 180 / 140 / 140 pounds per acre

Limestone: 2 tons per acre

Banding a portion or all of the phosphate and potash two inches to the side and below the seed level may result in increased yields on soils testing low in either or both phosphorous and potassium. For soils testing medium or higher, either banding or broadcasting are effective methods of application. If fertilizer is placed directly with the seed, do not apply more than 30 pounds per acre of nitrogen or nitrogen plus potash to prevent seedling injury and loss of stand.

Split applications of nitrogen may be beneficial when nitrogen rates are greater than 120 pounds per acre. See Corn Nitrogen Rate Calculator at www.utcrops.com.

If nitrogen sources containing urea are not incorporated, some loss of nitrogen may occur if applied to moist soils followed by three or more days of rapidly drying conditions without rainfall.

Reduce N rate by 60 to 80 pounds per acre following a winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.

If zinc was tested and is below 2 pounds per acre, apply five pounds of zinc (approximately 15 pounds zinc sulfate) per acre just prior to planting.

See back of this report for interpretation and detailed explanation of results and recommendations. You may contact us or your County Extension Agent if you have questions. We appreciate your business!

UT EXTENSION
INSTITUTE OF AGRICULTURE
THE UNIVERSITY OF TENNESSEE

On the web at ag.tennessee.edu/spp or Facebook at SoilPlantandPestCenter.

SOIL TEST REPORT

TOSH FARMS

1586 ATLANTIC AVENUE
HENRY, TN 382310000

Deborah K. Joines
Deborah K. Joines
Manager
Soil, Plant and Pest Center
5201 Marchant Drive
Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

Date Tested: 1/8/2015

County: Henry

Lab Number: 495720

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID 663

(Pounds Per Acre)

Water pH	Buffer Value	P Phosphorus	K Potassium	Ca Calcium	Mg Magnesium	Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
6.8		14 *L*	82 *L*	2133 *S*	110 *S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

663

Fertilizer/Lime Application Rate and Timing

Corn (150-175 BU/A)

N / P_2O_5 / K_2O

Nitrogen/Phosphate/Potash: 180 / 140 / 140 pounds per acre

Limestone: Lime is not recommended at this time

Banding a portion or all of the phosphate and potash two inches to the side and below the seed level may result in increased yields on soils testing low in either or both phosphorous and potassium. For soils testing medium or higher, either banding or broadcasting are effective methods of application. If fertilizer is placed directly with the seed, do not apply more than 30 pounds per acre of nitrogen or nitrogen plus potash to prevent seedling injury and loss of stand.

Split applications of nitrogen may be beneficial when nitrogen rates are greater than 120 pounds per acre. See Corn Nitrogen Rate Calculator at www.utcrops.com.

If nitrogen sources containing urea are not incorporated, some loss of nitrogen may occur if applied to moist soils followed by three or more days of rapidly drying conditions without rainfall.

Reduce N rate by 60 to 80 pounds per acre following a winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.

If zinc was tested and is below 2 pounds per acre, apply five pounds of zinc (approximately 15 pounds zinc sulfate) per acre just prior to planting.

TOSH FARMS - Page 1

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SOIL TEST REPORT

TOSH FARMS

P O BOX 308
HENRY, TN 382310000

Deborah K. Joines
Manager
Soil, Plant and Pest Center
5201 Marchant Drive
Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

Date Tested: 12/31/2015

County: Henry **Lab Number:** 514630

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID F113-1 **(Pounds Per Acre)**

Water pH	Buffer Value	P Phosphorus	K Potassium	Ca Calcium	Mg Magnesium	Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
5.9	7.7	13 *L*	163 *H*	1201 *S*	104 *S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

F113-1 **Fertilizer/Lime Application Rate and Timing**

Corn (150-175 BU/A)

N / P_2O_5 / K_2O

Nitrogen/Phosphate/Potash: 180 / 140 / 0 pounds per acre

Limestone: 1.5 tons per acre

Banding a portion or all of the phosphate and potash two inches to the side and below the seed level may result in increased yields on soils testing low in either or both phosphorous and potassium. For soils testing medium or higher, either banding or broadcasting are effective methods of application. If fertilizer is placed directly with the seed, do not apply more than 30 pounds per acre of nitrogen or nitrogen plus potash to prevent seedling injury and loss of stand.

Split applications of nitrogen may be beneficial when nitrogen rates are greater than 120 pounds per acre. See Corn Nitrogen Rate Calculator at www.utcrops.com.

If nitrogen sources containing urea are not incorporated, some loss of nitrogen may occur if applied to moist soils followed by three or more days of rapidly drying conditions without rainfall.

Reduce N rate by 60 to 80 pounds per acre following a winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.

If zinc was tested and is below 2 pounds per acre, apply five pounds of zinc (approximately 15 pounds zinc sulfate) per acre just prior to planting.

TOSH FARMS - Page 1

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SOIL TEST REPORT

TOSH FARMS

P O BOX 308
HENRY, TN 382310000

Deborah K. Joines
Deborah K. Joines
Manager
Soil, Plant and Pest Center
5201 Marchant Drive
Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

Date Tested: 1/4/2016

County: Henry

Lab Number: 514887

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID F934-1

(Pounds Per Acre)

Water pH	Buffer Value	P Phosphorus		K Potassium		Ca Calcium		Mg Magnesium		Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
6.4		17	*L*	121	*M*	2221	*S*	210	*S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

F934-1

Fertilizer/Lime Application Rate and Timing

Corn (150-175 BU/A)

$N / P_2O_5 / K_2O$

Nitrogen/Phosphate/Potash: 180 / 140 / 70 pounds per acre

Limestone: Lime is not recommended at this time

Banding a portion or all of the phosphate and potash two inches to the side and below the seed level may result in increased yields on soils testing low in either or both phosphorous and potassium. For soils testing medium or higher, either banding or broadcasting are effective methods of application. If fertilizer is placed directly with the seed, do not apply more than 30 pounds per acre of nitrogen or nitrogen plus potash to prevent seedling injury and loss of stand.

Split applications of nitrogen may be beneficial when nitrogen rates are greater than 120 pounds per acre. See Corn Nitrogen Rate Calculator at www.utcrops.com.

If nitrogen sources containing urea are not incorporated, some loss of nitrogen may occur if applied to moist soils followed by three or more days of rapidly drying conditions without rainfall.

Reduce N rate by 60 to 80 pounds per acre following a winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.

If zinc was tested and is below 2 pounds per acre, apply five pounds of zinc (approximately 15 pounds zinc sulfate) per acre just prior to planting.

TOSH FARMS - Page 1

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SOIL TEST REPORT

Deborah K. Joines
Manager
Soil, Plant and Pest Center
5201 Marchant Drive
Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

TOSH FARMS

P O BOX 308
HENRY, TN 382310000

Date Tested: 1/27/2016

County: Henry

Lab Number: 516702

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID F9451

(Pounds Per Acre)

Water pH	Buffer Value	P Phosphorus	K Potassium	Ca Calcium	Mg Magnesium	Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
6.5		15 *L*	231 *H*	2328 *S*	388 *S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

F9451

Fertilizer/Lime Application Rate and Timing

Corn (150-175 BU/A)

N / P_2O_5 / K_2O

Nitrogen/Phosphate/Potash: 180 / 140 / 0 pounds per acre

Limestone: Lime is not recommended at this time

Banding a portion or all of the phosphate and potash two inches to the side and below the seed level may result in increased yields on soils testing low in either or both phosphorous and potassium. For soils testing medium or higher, either banding or broadcasting are effective methods of application. If fertilizer is placed directly with the seed, do not apply more than 30 pounds per acre of nitrogen or nitrogen plus potash to prevent seedling injury and loss of stand.

Split applications of nitrogen may be beneficial when nitrogen rates are greater than 120 pounds per acre. See Corn Nitrogen Rate Calculator at www.utcrops.com.

If nitrogen sources containing urea are not incorporated, some loss of nitrogen may occur if applied to moist soils followed by three or more days of rapidly drying conditions without rainfall.

Reduce N rate by 60 to 80 pounds per acre following a winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.

If zinc was tested and is below 2 pounds per acre, apply five pounds of zinc (approximately 15 pounds zinc sulfate) per acre just prior to planting.

TOSH FARMS - Page 1

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SOIL TEST REPORT

TOSH FARMS

P O BOX 308
HENRY, TN 382310000

Deborah K. Joines
Manager
Soil, Plant and Pest Center
5201 Marchant Drive
Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

Date Tested: 1/27/2016

County: Henry

Lab Number: 516323

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID F121-2

(Pounds Per Acre)

Water pH	Buffer Value	P Phosphorus		K Potassium		Ca Calcium		Mg Magnesium		Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
6.2		28	*M*	118	*M*	1794	*S*	281	*S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

F121-2

Fertilizer/Lime Application Rate and Timing

Corn (150-175 BU/A)

N / P_2O_5 / K_2O

Nitrogen/Phosphate/Potash: 180 / 70 / 70 pounds per acre

Limestone: Lime is not recommended at this time

Banding a portion or all of the phosphate and potash two inches to the side and below the seed level may result in increased yields on soils testing low in either or both phosphorous and potassium. For soils testing medium or higher, either banding or broadcasting are effective methods of application. If fertilizer is placed directly with the seed, do not apply more than 30 pounds per acre of nitrogen or nitrogen plus potash to prevent seedling injury and loss of stand.

Split applications of nitrogen may be beneficial when nitrogen rates are greater than 120 pounds per acre. See Corn Nitrogen Rate Calculator at www.utcrops.com.

If nitrogen sources containing urea are not incorporated, some loss of nitrogen may occur if applied to moist soils followed by three or more days of rapidly drying conditions without rainfall.

Reduce N rate by 60 to 80 pounds per acre following a winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.

If zinc was tested and is below 2 pounds per acre, apply five pounds of zinc (approximately 15 pounds zinc sulfate) per acre just prior to planting.

TOSH FARMS - Page 1

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SOIL TEST REPORT

Deborah K. Joines

Deborah K. Joines
Manager
Soil, Plant and Pest Center
5201 Marchant Drive
Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

TOSH FARMS

P O BOX 308
HENRY, TN 382310000

Date Tested: 1/29/2016

County: Henry

Lab Number: 517357

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID F121

(Pounds Per Acre)

Water pH	Buffer Value	P Phosphorus	K Potassium	Ca Calcium	Mg Magnesium	Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
6.8		20 *M*	109 *M*	2632 *S*	227 *S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

F121

Fertilizer/Lime Application Rate and Timing

Corn (150-175 BU/A)

$N / P_2O_5 / K_2O$

Nitrogen/Phosphate/Potash: 180 / 70 / 70 pounds per acre

Limestone: Lime is not recommended at this time

Banding a portion or all of the phosphate and potash two inches to the side and below the seed level may result in increased yields on soils testing low in either or both phosphorous and potassium. For soils testing medium or higher, either banding or broadcasting are effective methods of application. If fertilizer is placed directly with the seed, do not apply more than 30 pounds per acre of nitrogen or nitrogen plus potash to prevent seedling injury and loss of stand.

Split applications of nitrogen may be beneficial when nitrogen rates are greater than 120 pounds per acre. See Corn Nitrogen Rate Calculator at www.utcrops.com.

If nitrogen sources containing urea are not incorporated, some loss of nitrogen may occur if applied to moist soils followed by three or more days of rapidly drying conditions without rainfall.

Reduce N rate by 60 to 80 pounds per acre following a winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.

If zinc was tested and is below 2 pounds per acre, apply five pounds of zinc (approximately 15 pounds zinc sulfate) per acre just prior to planting.

TOSH FARMS - Page 1

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INSTITUTE OF AGRICULTURE
THE UNIVERSITY OF TENNESSEE

On the web at ag.tennessee.edu/spp or Facebook at SoilPlantandPestCenter.

SOIL TEST REPORT

TOSH FARMS

P O BOX 308
HENRY, TN 382310000

Deborah K. Joines
Manager
Soil, Plant and Pest Center
5201 Marchant Drive
Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

Date Tested: 1/4/2016

County: Henry

Lab Number: 514916

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID **F937-2**

(Pounds Per Acre)

Water pH	Buffer Value	P Phosphorus		K Potassium		Ca Calcium		Mg Magnesium		Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
5.9	7.6	10	*L*	81	*L*	2185	*S*	236	*S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

F937-2

Fertilizer/Lime Application Rate and Timing

Corn (150-175 BU/A)

$N / P_2O_5 / K_2O$

Nitrogen/Phosphate/Potash: 180 / 140 / 140 pounds per acre

Limestone: 2 tons per acre

Banding a portion or all of the phosphate and potash two inches to the side and below the seed level may result in increased yields on soils testing low in either or both phosphorous and potassium. For soils testing medium or higher, either banding or broadcasting are effective methods of application. If fertilizer is placed directly with the seed, do not apply more than 30 pounds per acre of nitrogen or nitrogen plus potash to prevent seedling injury and loss of stand.

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TOSH FARMS

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HENRY, TN 382310000

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Manager
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5201 Marchant Drive
Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

Date Tested: 1/27/2016

County: Henry

Lab Number: 516557

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID F195138 — **(Pounds Per Acre)**

Water pH	Buffer Value	P Phosphorus	K Potassium	Ca Calcium	Mg Magnesium	Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
6.2		29 *M*	119 *M*	1471 *S*	126 *S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

F195138 — **Fertilizer/Lime Application Rate and Timing**

Corn (150-175 BU/A)

N / P_2O_5 / K_2O

Nitrogen/Phosphate/Potash: 180 / 70 / 70 pounds per acre

Limestone: Lime is not recommended at this time

Banding a portion or all of the phosphate and potash two inches to the side and below the seed level may result in increased yields on soils testing low in either or both phosphorous and potassium. For soils testing medium or higher, either banding or broadcasting are effective methods of application. If fertilizer is placed directly with the seed, do not apply more than 30 pounds per acre of nitrogen or nitrogen plus potash to prevent seedling injury and loss of stand.

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Manager
Soil, Plant and Pest Center
5201 Marchant Drive
Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

Date Tested: 12/31/2015

County: Henry

Lab Number: 514501

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID F938-1

(Pounds Per Acre)

Water pH	Buffer Value	P Phosphorus	K Potassium	Ca Calcium	Mg Magnesium	Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
5.8	7.6	8 *L*	89 *L*	2004 *S*	254 *S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

F938-1

Fertilizer/Lime Application Rate and Timing

Corn (150-175 BU/A)

N / P_2O_5 / K_2O

Nitrogen/Phosphate/Potash: 180 / 140 / 140 pounds per acre

Limestone: 2 tons per acre

Banding a portion or all of the phosphate and potash two inches to the side and below the seed level may result in increased yields on soils testing low in either or both phosphorous and potassium. For soils testing medium or higher, either banding or broadcasting are effective methods of application. If fertilizer is placed directly with the seed, do not apply more than 30 pounds per acre of nitrogen or nitrogen plus potash to prevent seedling injury and loss of stand.

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SOIL TEST REPORT

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Manager
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Nashville, TN 37211-5112
(615) 832-5850
soilplantpestcenter@utk.edu

Date Tested: 1/26/2016

County: Henry

Lab Number: 516245

Mehlich 1 SOIL TEST RESULTS and RATINGS

Sample ID F931-1 — (Pounds Per Acre)

Water pH	Buffer Value	P Phosphorus		K Potassium		Ca Calcium		Mg Magnesium		Zn Zinc	Fe Iron	Mn Manganese	B Boron	Na Sodium	S-NH4OAC Sulfur	Nitrates-ISE (ppm)
7.5		42	*H*	90	*L*	3504	*S*	152	*S*							

Organic Matter %	Soluble Salts PPM**

RECOMMENDATIONS

F931-1 — **Fertilizer/Lime Application Rate and Timing**

Corn (150-175 BU/A)

$N / P_2O_5 / K_2O$

Nitrogen/Phosphate/Potash: 180 / 0 / 140 pounds per acre

Limestone: Lime is not recommended at this time

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